

# 1990 Census of Population and Housing

## History

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# CHAPTER 1.

## Introduction and Overview

### INTRODUCTION

#### General Information

The 1990 Census of Population and Housing—the twenty-first decennial census of the United States—was taken as of April 1, 1990, by the Bureau of the Census, an agency of the U.S. Department of Commerce. This census covered the 50 States, the District of Columbia, Puerto Rico, the Virgin Islands of the United States, and the Pacific island territories (American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and, by special agreement, the Republic of Palau).

For the 50 States and the District of Columbia, the 1990 census counted and tabulated data for 248,709,873 people (an increase of over 22 million since the 1980 census) and 102,263,678 housing units (nearly 13 million more units than in 1980). In Puerto Rico, 3,522,037 people were counted; in the Virgin Islands, 101,809; in American Samoa, 46,773; in the Northern Mariana Islands, 43,345; in Guam, 133,152; and in Palau, 15,122.

The data collected for the 50 States, the District of Columbia, and Puerto Rico were derived from a limited number of basic questions asked of every person and about every housing unit (referred to as the “100-percent” items), and from additional questions asked of only a sample of the population and about only a sample of the housing units (referred to as the “sample” questions). The Bureau relied on two basic questionnaires to collect these data: a “short form” containing only the 100-percent questions, and a “long form” containing both the 100-percent questions and the additional sample questions. In the Virgin Islands and the Pacific island territories, the data were derived from questions asked of the entire population and about every housing unit; there were no questions asked on a sample basis.

There was considerable interest in demographic change and its political implications in the United States during the 1980's, in particular, in how the racial and ethnic “mix” had been altered as a result of massive immigration. The 1990 census figures revealed the following breakdown:

Race	Population in 1990	Percentage increase over 1980 population
All persons .....	248,709,873 (100.0%)	9.8
White .....	199,686,070 ( 80.3%)	5.6
Black .....	29,986,060 ( 12.1%)	13.2
American Indian/ Alaska Native .....	1,959,234 ( 0.8%)	27.7
Asian/Pacific Islander .	7,273,662 ( 2.9%)	95.2
Other .....	9,804,847 ( 3.9%)	70.0
Hispanic origin (could be any race) ..	22,354,059 ( 9.0%)	53.1

Sources: U.S. Bureau of the Census, 1990 Census of Population, *General Population Characteristics*, series 1990 CP-1-1; 1980 Census of Population, *General Social and Economic Characteristics*, series PC80-1-C1.

The 1990 decennial census period (for budget purposes) extended from October 1, 1983 to September 30, 1993—planning through publication. The 1990 census cost approximately \$2.5 billion,<sup>1</sup> created 500,000 temporary jobs, and employed as many as 250,000 people at once during the peak of operations in 1990.

#### Census Day

Census Day for the United States was April 1, 1990.<sup>2</sup> On December 26, 1990, Secretary of Commerce Robert A. Mosbacher delivered to President George Bush the Census Bureau's official population counts by State for purposes of reapportioning the seats in the House of Representatives, along with the number of seats per State calculated according to the method the Congress had specified. The President formally transmitted the tabulations to the House on January 3, 1991.

<sup>1</sup>Planning was already in progress when the decennial period began. This was followed by preparation; data collection, processing, and dissemination; and evaluation. Some of the evaluation began during the planning and preparation stages—in testing, for example—and continued past the decennial period as part of the planning for the next census.

<sup>2</sup>As it had been in each decennial enumeration since 1930 (see box). All census questions generally were to be answered with reference to April 1, 1990, regardless of when the questionnaire might have been completed. (The question, “Did this person work at any time LAST WEEK?” and related questions about hours worked and location referred to the full calendar week before the questionnaire was filled out. Questions on occupation and residence 5 years ago, however, specified April 1, 1985.) In remote areas of Alaska, the enumerators began making their rounds in mid-February, before the spring thaw, but asked all the questions in relation to Census Day. If a birth was expected between then and April 1, they asked the respondent to mail in a report for the new arrival.

### CENSUS DAYS: 1790 to 1990

1790-1820	First Monday in August
1830-1900	June 1
1910	April 15
1920	January 1
1930-1990	April 1

The Census Act approved on March 1, 1790, set the reference date (Census Day) as the first Monday in August 1790 to comply with the constitutional provision (Article I, Section 2) that the "actual Enumeration shall be made within three Years after the first Meeting of the Congress of the United States..." and to allow the U.S. marshals time to organize their data-collection operations. As the enumeration took 9 months or more every decade, a significant part of the work took place in the winter. Therefore, in 1830 Congress agreed to move Census Day back to June 1, where it remained through 1900 (with significant additions to the field force to make sure the canvassing was completed before fall).

In 1900, when the date was moved back still further—to April 15—the enumerators finished most of their work in 90 days, and in 1910, in 30 days. For 1920, Census Day was moved to January 1, under the assumption that the enumerators, who took both the population and agriculture censuses at the same time, would find farmers both at home and with data for calendar 1919 readily at hand. The winter weather caused so many delays that for 1930, Congress moved Census Day to April 1, and subsequently codified that date in Title 13, Section 141.1, of the U.S. Code (see app. 1A).

These events occurred because Article I, Section 2, of the U.S. Constitution, required that—

Representatives and direct Taxes<sup>3</sup> shall be apportioned among the several States which may be included within this Union, according to their respective Numbers.... The actual Enumeration shall be made within three Years after the first Meeting of the Congress of the United States, and within every subsequent Term of ten Years, in such Manner as they shall by Law direct.

—and Title 13, United States Code, the statute under which the Census Bureau operated, set the delivery time—9 months from Census Day. (See app. 1A for the title's provisions relating to the 1990 census.)

In 1975, Public Law 94-171 amended Title 13 and required the Bureau to deliver to each State, within 1 year after Census Day, maps and population counts for officials to use in drawing congressional, State, and local legislative boundaries that would comply with court

<sup>3</sup>The sixteenth amendment to the U.S. Constitution (ratified in 1913) gave the congress the power to collect income taxes on income from any source without regard to apportionment among the States or to the populations of the States.

mandates for "equal representation." The Bureau transmitted these materials—for nearly 7 million census blocks and over 170,000 State-provided voting districts (VTD's)—between January 14 and March 8, 1991. (See p. 31 and ch. 10.)

At the end of August 1990, the Bureau sent postcensus local review counts of housing units and the group quarters population at the block level to each of the 39,000 governmental units in the United States. A summary page also included the total population of the governmental unit and the number of vacant housing units. Increasingly detailed data sets emerged from that time forward on computer tapes and cartridges, the new compact discs—read-only memory (CD-ROM's), electronic online services, and computer printouts where needed; paper volumes and microfiche were produced for those without access to a computer.

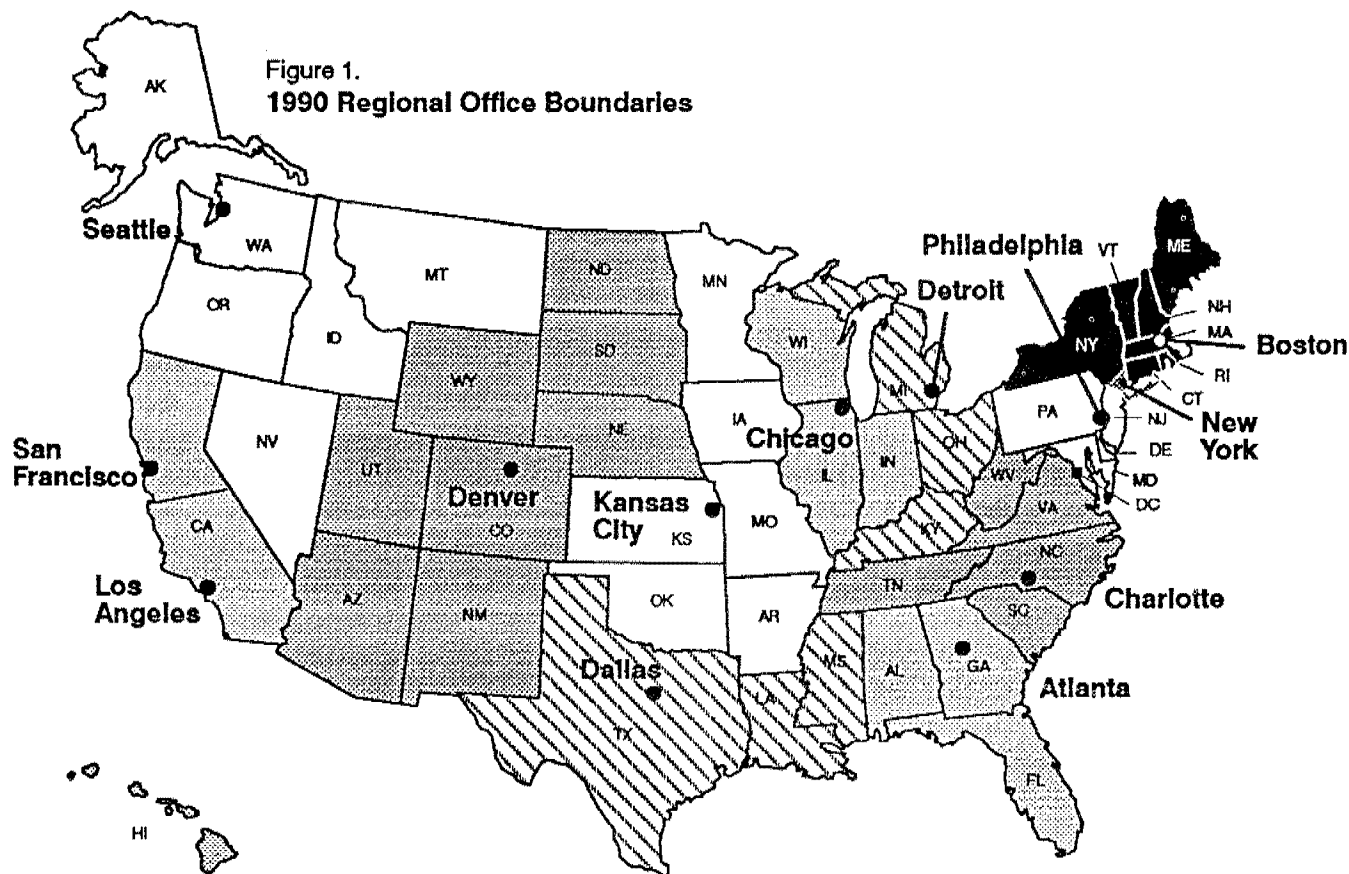
### Bureau of the Census

The 1990 census was administered from the Census Bureau's headquarters in Suitland, MD, with added space in nearby "satellite" locations as needed. Large-scale clerical operations were handled at the Data Preparation Division's office in Jeffersonville, IN.<sup>4</sup> To supplement the electronic equipment at headquarters, and as part of its recovery plan for dealing with potential disasters, the agency established a second computer center in Charlotte, NC, in January 1990.

There were 12 regional offices (RO's) throughout the country that undertook various current surveys and, during the decennial census, supervised that activity in their areas. (See fig. 1.) These offices were in Atlanta, GA; Boston, MA; Charlotte, NC; Chicago, IL; Dallas, TX; Denver, CO; Detroit, MI; Kansas City, KS; Los Angeles, CA; New York, NY; Philadelphia, PA; and Seattle, WA. For the census field enumeration, each RO established a companion "regional census center" (RCC) nearby (however, the Kansas City RCC was across the river in Missouri, and the Los Angeles RO had a second RCC in San Francisco). These 13 RCC's managed 449 temporary district offices (DO's) throughout the 50 States and the District of Columbia for data collection, and an additional 38 offices for outreach. The New York RCC also supervised nine DO's and an area office in Puerto Rico, while headquarters directed five DO's in the Virgin Islands and the Pacific island territories (see ch. 13).

Whereas the 1980 census had three processing offices (PO's), in Jeffersonville, IN; New Orleans, LA; and Laguna Niguel, CA, the 1990 census had seven—Albany, NY; Austin, TX; Baltimore, MD; Jacksonville, FL; Jeffersonville, IN (in the Bureau's permanent facility there); Kansas City, MO; and San Diego, CA. (See "Processing Offices," p. 28.)

<sup>4</sup>The "age search" unit in Pittsburg, KS, with all its microfilm, maps, and directories, was moved to the Jeffersonville, IN, facility in the summer of 1992.



The Bureau's permanent staff (see fig. 2) provided planning, direction, and support services for the 1990 census. However, temporary staffs in the RCC's, DO's, and PO's were by far the largest component of the decennial census work force.

## History

U.S. marshals and their assistants, under the direction of the Secretary of State (Thomas Jefferson), took the first census in 1790. With minor modifications and extensions, the act authorizing this decennial census served until 1840. The questions in 1790 were limited to six items: In each household, the name of the head of the family and the number of people by category—free White males 16 years and older (to measure military potential), free White males under 16, free White females, all other free persons (i.e., free Blacks and American Indians who paid taxes), and slaves (mainly Blacks).

The number of questions grew significantly after 1790. By 1840, the marshals were gathering data about education, literacy, and occupation, and, as they made their rounds, they also had to take censuses of manufactures (beginning in 1810) and agriculture and mineral

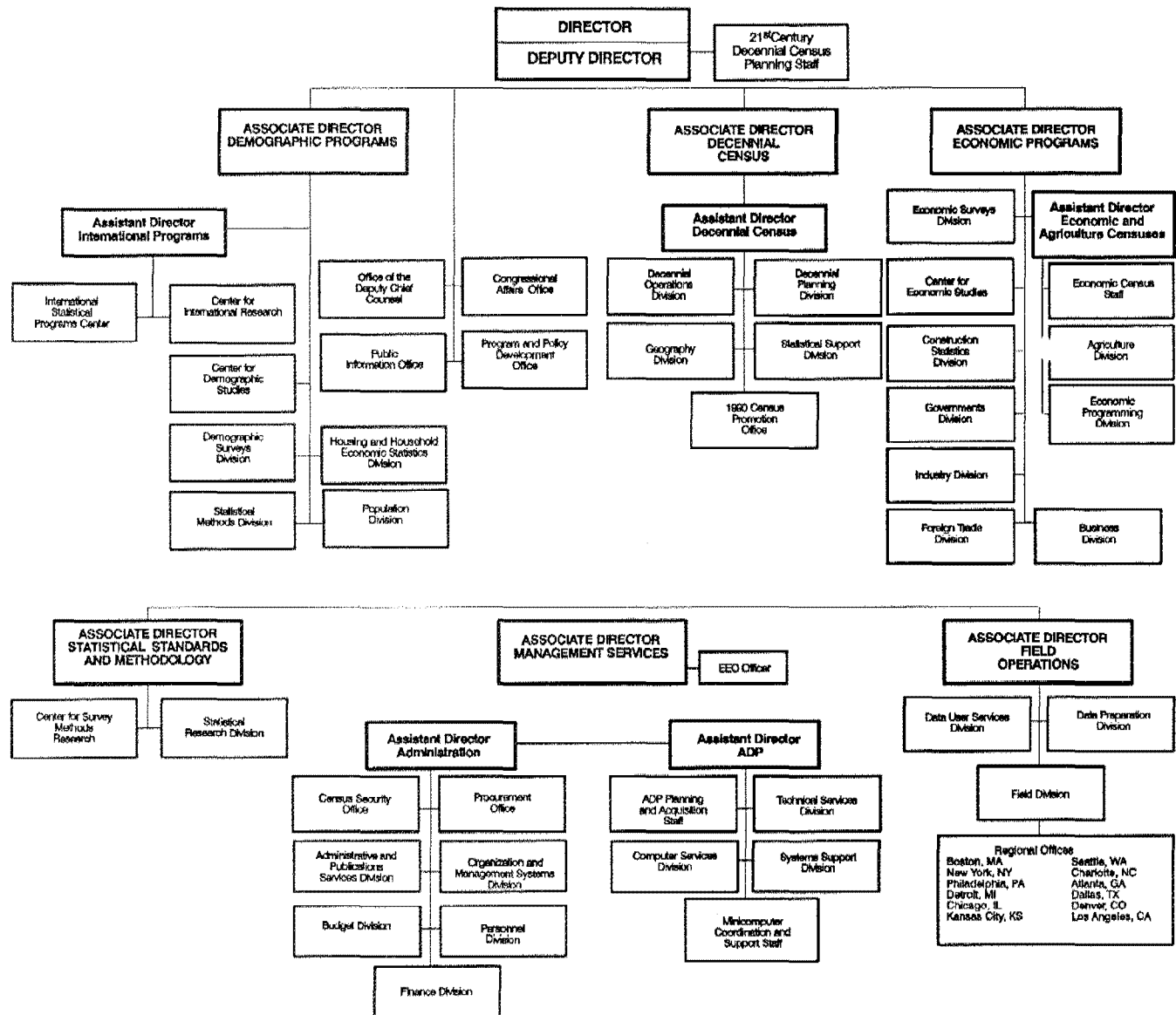
industries (beginning in 1840). In 1850, the population census started recording each person's name and his/her characteristics.<sup>5</sup>

As the census increased in size and complexity, it ultimately became too large and technical for the U.S. Marshals Service to manage. For 1880, the Congress directed that the census have its own temporary work force of over 30,000 specially appointed supervisors and enumerators. The 1880 census was a vast undertaking, with hundreds of minor items in addition to the basic questions. The enumerators gathered the information in a timely manner, but now the difficulty was in processing these mountains of data by hand; some of the detailed results were not published until just before the 1890 census. In time for the 1890 census, a former census employee, Herman Hollerith, designed a system of punchcards and electric tabulating machines that reduced considerably the time needed to complete the clerical work. Each machine could tabulate 250 items a minute. This was the Hollerith system's first major use, and the 1890 census opened a new era in automated data processing for the United States and the world.

The decennial censuses from 1790 through 1900 involved recruiting temporary work forces just before the enumeration activities began every 10 years and then

<sup>5</sup>For details, see U.S. Bureau of the Census, *200 Years of U.S. Census Taking: Population and Housing Questions, 1790-1990* (Washington, DC: Government Printing Office, 1989).

Figure 2. Bureau of the Census Organization at the Time of the 1990 Decennial Census



disbanding them as quickly as possible, leaving masses of tabulations for a few clerks to make ready for the printers. Early in the 19th century, observers and data users complained about the haste and statistical inaccuracies this caused, and about the lack of continuity and experience in the Federal censuses. Moreover, if the census had an ongoing organization, it could spread its various data-collection and publication activities more evenly over time. The Congress finally recognized the need and established a permanent Census Office in the Department of the Interior in 1902. In 1903, the agency moved to the new Department of Commerce and Labor, where it became the Bureau of the Census. When that department was split in 1913, the Bureau went to the Department of Commerce and remained in downtown Washington, DC, until 1942, when it moved to nearby Suitland, MD.

The 1940 census was, in many ways, the first “modern” census: Not only did it collect a variety of information about the general conditions of U.S. housing for the first time, but it also used the new technique called probability “sampling” to collect answers to some of the detailed questions. This meant that, for the first time, the enumerators asked some questions of only a fraction of the population. Using those responses, the tabulation staff could produce reliable estimates for the entire Nation. The use of sampling and estimation reduced both enumeration and processing time as well as response burden on the public.

Punchcard, data-processing technology continued to advance through the 1950 census, by which time an electric tabulator could tabulate 2,000 items a minute. In 1951, the Census Bureau acquired the first commercially available general-purpose electronic computers,

UNIVAC I (an acronym for “universal automatic computer”). The UNIVAC I accepted punchcard data transferred to magnetic tape and could tabulate 4,000 items a minute. (Subsequent generations of computers increased that speed to over a million items a minute.)

To take advantage of electronic computers, however, there had to be advances in getting the responses ready for processing. Punching cards was still basically a manual operation subject to human error, and an operation that created huge quantities of perishable records. During the 1950's, staff at the National Bureau of Standards (now the National Institute of Standards and Technology) worked with Census Bureau staff to create a system called FOSDIC (film optical sensing device for input to computers), which was used in the 1960 census. The 1960 questionnaires were designed so that respondents, enumerators, or clerks could mark small circles to indicate the proper answers. The questionnaires then were microfilmed. FOSDIC “read” the microfilm and transferred the data to magnetic tape for the Bureau's mainframe computers. The paper questionnaires then were destroyed under secure conditions; the microfilm records (with names on them) and the electronic tapes (with data only) remained for future use and ultimate deposit in the National Archives. The Bureau continued to use punchcards for administrative purposes and other censuses and surveys until the late 1960's, when it converted to key-to-tape equipment, effectively ending the “punchcard era.”

The 1960 census also marked a major change in sampling technique, a change that has continued in subsequent enumerations. Instead of asking the sample questions of only selected individuals (1940 and 1950) and housing units (1950), the housing unit—with all its occupants—became the sample unit.

Although the Bureau had experimented for decades with using the U.S. mail to conduct decennial census enumeration activities, and did employ the technique for some other censuses and surveys, the 1960 census was the first in which the Bureau used the mail extensively to collect population and housing data rather than depend entirely on door-to-door canvassing. Postal carriers delivered unaddressed questionnaires to every housing unit on their routes. These forms instructed each householder to answer the basic 100-percent questions and hold the completed form until an enumerator arrived to pick it up. At those housing units where the sample questions were to be asked (every fourth housing unit), the enumerator either left another questionnaire, to be filled and mailed to the census district office, or collected the information on the spot. Advance delivery covered about 80 percent of the population living in roughly half the Nation's land area.

In 1970, the Bureau used Postal Service carriers to deliver individually addressed questionnaires to households in areas containing approximately 60 percent of the housing units and asked the members of those households to complete the questionnaires and return

them by mail. This became known as the “mailout/mailback” technique. Some of the households received short forms containing only the 100-percent questions; those in the sample received long forms that had both the 100-percent and additional questions. In an effort to reduce response burden while still maintaining a sample large enough to produce data for small areas, the 1970 census asked some questions of either a 15-percent or a 5-percent sample of housing units; some questions were asked of both samples, thus constituting a 20-percent sample for some items. Thus, every fifth housing unit received a long form of some kind. For 1980, there was just one long form, which for most of the country was distributed to one out of every six housing units (16.7 percent). In counties, incorporated places, and minor civil divisions that functioned as general-purpose governmental units and that had estimated populations below 2,500 (and on all American Indian reservations and in all Alaska Native village statistical areas), however, the sampling rate was 1-in-2 (50 percent) in order to provide reliable estimates for these small areas to meet the statistical needs of certain Federal programs. Together, the 16.7- and 50-percent samples were roughly equivalent to the 1970 rate of 20 percent. For 1980, though, the mailback census extended to areas containing 95 percent of the housing units, with the “conventional” door-to-door enumeration used elsewhere. In the mailback areas, enumerators telephoned or visited the units to obtain missing information. The 1990 census modified the mail delivery technique for a portion of the housing units covered by the mailback technique. The Bureau used the mailback approach for about 94.4 percent of the Nation's housing units. The United States Postal Service (USPS) delivered addressed questionnaires to 84.3 percent of the housing units. In areas where it was difficult to obtain adequate mailing addresses for USPS delivery (i.e., approximately 10.1 percent of the housing units), Bureau enumerators personally left the questionnaires for completion. Conventional canvassing (called “list/enumerate” in 1990) accounted for the remaining 5.6 percent of housing units.

The 1990 sampling scheme was an extension of the one used in 1980: Areas of the country containing over half of the households and housing units were sampled on a 1-in-6 basis. In large census tracts and block-numbering areas—generally those with more than 2,000 housing units, the sample rate was 1-in-8. For governmental units containing fewer than 2,500 people, the rate was 1-in-2. The overall sampling rates for 1990 included about 15 percent of the population and 16 percent of the housing units.

The mailout/mailback census required complex control systems. To have the USPS deliver questionnaires and allow the DO's to account for the returns, address lists had to be complete and as automated as possible; where they were not, there had to be hand listing and checking. Also, systems for assigning nonresponse or incomplete cases for followup and for monitoring returns

had to be in place. In addition, there had to be ways, preferably automated, for assigning each housing unit to a geographic area for collection and tabulation purposes. In response to this challenge, the Census Bureau created, and continues to maintain, an automated address control file of all living quarters. To assign housing units to geographic entities, the Bureau updated and enhanced the automated “geocoding” techniques it developed for the 1970 and 1980 censuses.<sup>6</sup> In cooperation with the U.S. Geological Survey (USGS), the Bureau devised a system called TIGER (Topologically Integrated Geographic Encoding and Referencing) that was used to document all streets, roads, rivers, lakes, railroads, and their attributes (names and address ranges, where appropriate), as well as the boundaries, names, and codes of all geographic entities used for data collection and tabulation for the entire United States, Puerto Rico, the Virgin Islands, and the Pacific island territories for the 1990 census. In addition to supporting the geocoding requirement, the TIGER System also provided a means to produce the many different maps required for data collection and dissemination, and the geographic stubs and headers for the data tabulations.

In the latter part of the 20th century, experts developed ways to evaluate census coverage by electronically comparing large files of census and survey records with each other and with records from independent sources. As part of the Bureau’s effort to assess the quality and comprehensiveness of decennial census data, statisticians and demographers created increasingly sophisticated computer models for estimating the values of such key variables as net undercount by age, race, and Hispanic origin. In the decades after the 1960 census, not only representation at the State and sub-state levels, but also Federal program funding were based increasingly on decennial census figures for variables such as race, Hispanic origin, and housing characteristics

Thus, decennial census coverage became an important, and increasingly contentious, issue. There was growing pressure both for and against using a post-enumeration survey and sophisticated statistical models to “adjust” census figures to include individuals and housing units missed during the census from census “stakeholders” (government agencies, non-profit organizations, academic and policy researchers, and private companies) not to mention the political parties, the Congress, and the Administration. More than half of the 22 lawsuits filed in connection with the 1990 census

<sup>6</sup>Geocoding is assigning an address (such as that for a housing unit, business, or farm) to the geographic entities used by the Census Bureau for collecting and tabulating data. The Bureau has played a leading role in the development of automated geocoding over the past 30 years. Key events are summarized in 1970 Census of Population and Housing, *Procedural History*, PHC(R)-1 (Washington, DC: Government Printing Office, 1976) chapter 3 and 1980 Census of Population and Housing, *History, Part A*, PHC80-R-2A (Washington, DC: Government Printing Office, 1986) chapter 3.

dealt with issues related to the most correct way to achieve a complete accounting of the Nation’s population. (For a summary of this litigation, see pp. 41-43 and ch.12, forthcoming.)

## Census Law and Confidentiality

**Census Law: Title 13, United States Code**—The Constitution does not prescribe how the decennial census should be conducted, which questions are to be asked, or other vital aspects of census taking; instead, it empowers the Congress to conduct the census in “such Manner as they shall by Law direct.” The Congress passed special acts for taking each decennial census from 1790 through 1920 that gave detailed instructions about how to conduct the enumeration and which questions to ask. In 1929, the Congress passed the Permanent Census Act, under which the 1930 census was taken. The most notable feature of this act was the discretion it gave to the Secretary of Commerce (and, by delegation, to the Director of the Census Bureau) with regard to conducting the census. Modifications to the 1929 act, and additional legislation covering the census of housing, governed the 1940 and 1950 censuses.

In 1954, the Congress codified the census law into Title 13, U.S. Code (see app. 1A), and amended it several times over the years through 1994. As with the 1929 act, Title 13 gives the Secretary of Commerce discretion to enact decennial census plans, subject to executive and congressional review.

Title 13 does not specify which questions are to be asked. It does require that the Secretary (and, by delegation, the Census Bureau) advise the Congress of the general subject content it plans to include at least 3 years before the decennial census and on the specific questions it plans to ask at least 2 years before. The title does not specify the method of enumeration, but contains provisions relating to the areas to be covered, and the date (“within 9 months after the census date”) for delivering State population counts to the President.

The title requires that individuals answer the census. Anyone 18 years of age or older who willfully neglects or refuses to answer the census may be fined up to \$100. Anyone who gives false answers is subject to a fine of up to \$500.<sup>7</sup>

While Title 13 required the Bureau to maintain the confidentiality of individual census records (see section below), it did not specify the length of time they were to remain protected. Title 44, U.S. Code, however, required Federal agencies—including the Census Bureau—to deposit their official records in the National Archives. Once under Archives custody and jurisdiction, Title 44 governed how and when the records might be opened to the public. By agreement with the Census Bureau (Title

<sup>7</sup>In 1970, in addition to the fines, the law also provided for minor jail terms for refusal to answer or for answering falsely, but this provision was dropped prior to the 1980 census.



44, Section 2108(b)), this time for the censuses of population and housing and their associated surveys was set at 72 years from the census or survey date. Thus, the individual 1930 population census records would be released on or after April 1, 2002. Title 13, however, allowed the Bureau to provide official transcripts of closed population census records (for a fee) to the named individuals, their authorized representatives, or legal beneficiaries upon proof of death. This service was known familiarly as “age search,” since many recipients used the transcript as a proof of age in the absence of a birth certificate.

**Confidentiality of Census Materials**—The same law that makes answering the census mandatory provides strict confidentiality for the information gathered, stating that: “Neither the Secretary, nor any other officer or employee of the Department of Commerce or bureau or agency thereof, may...

1. use the information furnished under the provisions of this title for any purpose other than the statistical purposes for which it is supplied; or
2. make any publication whereby the data furnished by any particular establishment or individual under this title can be identified; or
3. permit anyone other than the sworn officers and employees of the Department or bureau or agency thereof to examine the individual reports.”

All employees of the Census Bureau must take an oath at the start of their employment, and periodically thereafter, to protect the confidentiality of information gathered in the census. Any employee who wrongfully discloses census information is subject to a fine of up to \$5,000 and/or imprisonment for up to 5 years.

With the advent of the mailout/mailback censuses, even the address lists used for enumeration purposes and the maps enumerators used to locate individual housing units in their assigned areas came under this protection. In litigation following the 1980 census, the City of New York challenged the counts and obtained a court order requiring the Bureau to turn over its address registers to the city so that local officials might compare the listings with their own records. The Bureau's director at the time, Vincent Barabba, refused. In 1982, the case ultimately reached the Supreme Court, which decided that census address lists could not be disclosed, either through civil discovery or the Freedom of Information Act.<sup>8</sup>

The DO's and PO's maintained tight security over questionnaires, whether still on paper or microfilmed, and after processing, contractors shredded and recycled

the processed questionnaires under Bureau supervision. Data transmissions moved electronically over dedicated, secure telephone lines, and disclosure-analysis programs made certain that no one could identify a particular person, household, or housing unit from the published or electronic tabulations.

## Unit of Enumeration

The basic element here was the “living quarters.” This could be a “housing unit”—occupied or vacant—or a group quarters. A housing unit was a house, an apartment, a group of rooms, a single room, a mobile home, or other accommodations actually used or intended for use as separate living quarters, i.e., those in which the occupants lived and ate separately from any other person in the building and that had direct access from outside the building or through a common hall. The occupants could be a single family, a person living alone, or up to eight unrelated individuals sharing living arrangements. The census obtained population characteristics for each person living in an occupied housing unit (the household) or in a group-quarters setting (see below) and housing characteristics for each housing unit, whether occupied or vacant.

The 1990 census housing inventory comprised both occupied and vacant housing units, except that it excluded vacant boats, tents, vans, mobile homes on sales lots, and the like, as well as vacant buildings still under construction, boarded up/burned out, or otherwise open to the elements. Nonresidential buildings were not housing units for census purposes, although a warehouse, for example, might have a housing unit within it that would be counted.

The census also had special procedures for enumerating individuals living in institutions or other types of group quarters (e.g., college dormitories, military barracks, prisons, hospitals, orphanages, convents, etc.). Information about the characteristics of the individuals in the group-quarters population was collected in an operation separate from the enumeration of housing units.<sup>9</sup> If a living quarters contained 9 or more individuals unrelated to the resident owner or renter, or 10 or more unrelated people, it also was considered a group quarters and not part of the housing-unit inventory, and no data were collected about the characteristics of those structures.

With a perceived increase in the numbers of “street people” in the United States since 1980, the 1990 census expanded its earlier program to enumerate people living in public and private shelters, at bus and train stations, and those visible on the streets during early morning hours. This program (see ch. 6) accounted for approximately 240,000 people.

<sup>8</sup>*Baldrige v. Shapiro*, 455 U.S. 345 (1982)

<sup>9</sup>The facilities with group-quarters population were called “special places”; these sometimes contained regular housing units.



## Residence Rules

The 1990 decennial census employed a series of “residence rules” to determine where people were to be counted as of Census Day. These rules helped assure that individuals were counted only once at the right place, and thereby contributed to a fair and equitable apportionment. Decennial census residence rules were based upon the concept of “usual place of abode” as presented in the original Census Act of 1790. That Act directed that:

“every person whose usual place of abode shall be in any family...shall be returned as of such family...and the name of every person, who shall be an inhabitant of every district, but without a settled place of residence shall be inserted...in that division where he or she shall be...and every person occasionally absent at the time of the enumeration as belonging to that place in which he usually resides in the United States.”

Usual place of abode evolved into usual place of residence and referred to the place where the person lived and slept most of the time. While most people had no trouble identifying their usual residence, others did. For example, usual residence was not always apparent for certain segments of the population including those with multiple residences, college students and students at boarding schools living away from the parental home, people travelling or visiting temporarily, institutionalized people, or citizens of foreign countries residing in or visiting the United States. The residence rules were developed to handle these and similar situations. (See app. 1C for a list of 1990 census residence rules.)

Reinstating a procedure from the 1970 census, when there were significant numbers of U.S. Armed Forces members overseas, the 1990 census included counts of military personnel and Federal civilian employees stationed outside the United States (and their respective dependents living with them), according to their state-side residence (or “home of record”). These counts, 922,819 people in all, were included only in the official State counts used for congressional apportionment and figured in one of the postcensal lawsuits (*Commonwealth of Massachusetts v. Franklin*). As in the past, the census excluded foreigners temporarily visiting or traveling in the United States, or living on the premises of a foreign country’s embassy, ministry, legation, chancellery, or consulate in the United States.

## CENSUS PLANNING AND DESIGN

Formal planning for the 1990 census began in late 1983 (fiscal year (FY) 1984) with a review of the successes and problems associated with the 1980 census. This review took into account various research, evaluation, and experimental program results. This information, coupled with anticipated advances in technology, led to certain goals for the 1990 census:

- Continue to meet legal deadlines as for 1980, but deliver data products to customers earlier.
- Maintain the coverage levels achieved in 1980, while narrowing the differential gap (“undercount”) for selected racial and ethnic groups and parts of the country.
- Try to reduce response burden, yet balance the importance of the data with the length or difficulty of the questionnaire.
- Improve public participation/cooperation, in part through stressing how the Bureau keeps individual responses confidential.
- Contain costs, allowing for inflation and increased workloads (more people and housing units than in 1980).

The staff expected that many of these goals could be met through increased automation, which also could ensure greater control and consistency during all census phases. A major step in this direction was the December 1983 agreement to join with the U.S. Geological Survey to jointly develop a computerized geographic system for the entire country. The TIGER System subsequently produced over 600,000 digital map files from which Bureau staff used electrostatic plotters to make paper map copies for 1990 data collection operations, allowed the Bureau to automatically geocode more than 55 million housing-unit addresses, and produced more than 100,000 digital map files from which Bureau staff could produce paper map copies for data users, together with a variety of electronic mapping and indexing files. (See ch. 3, “Census Geography.”) Other automation featured an address control file (ACF), a management information system (MIS), and the use of bar-code systems to track the status of all the questionnaires during collection and processing.

## Consultation with Data Users

With reapportionment and redistricting known to be very important issues for the 1990 census, the National Conference of State Legislatures polled State legislatures in 1982 about their data needs, and the Bureau met with a representative cross-section of the stakeholders in 1983. Expanding on the success of similar efforts before the 1970 and 1980 censuses, the Bureau held a series of local and regional public meetings in 1984-85 with representatives of civic, business, and professional organizations, academia, and State and local governments to hear their various data and geographic needs and discuss questionnaire content proposals. Lead agencies in the Bureau’s State Data Center (SDC) program, and their affiliates, organized and promoted many of these meetings. Participants made many recommendations about tabulations, geographic products, outreach, enumeration procedures, and the like.

In October 1984, the Bureau also established 10 Federal interagency working groups (IWG's), organized along questionnaire content lines and chaired by Bureau staff, to see what data might be needed to meet current legislative requirements. The IWG's reports—recommending about 200 questions—were sent to the Federal Agency Council (FAC) on the 1990 Census of Population and Housing during 1984 and 1985. As in 1960, 1970, and 1980, the Office of Management and Budget (OMB) organized the FAC to act as a forum for the exchange of information. Legally mandated uses of census data became the deciding factors when weighing conflicting requests for data to be covered in the 1990 census.

Eight of the Bureau's public advisory committees added important expertise in planning all phases of the 1990 census. The four ongoing—so-called “standing”—committees represented the American Economic Association, the American Marketing Association, the American Statistical Association, and the Population Association of America. In addition, the Department of Commerce established four 1990 Census Advisory Committees (just for this census) for the following populations: Black, Hispanic, Asians and Pacific Islanders, and—new as a formal committee for the 1990 census—American Indians and Alaska Natives. Successfully tested for 1980 with three official committees but only regional meetings with American Indians and Alaska Natives, this approach provided significant channels for two-way communication about data needs, outreach, and publicity (in which committee members played active roles), and led to greater mutual understanding. In addition, the Bureau held two rounds of regional meetings with American Indian groups, in 1985-86 and again in 1988-89. The standing committees met semiannually during the entire decennial census period, and the 1990 committees convened—usually twice a year—between 1985 and 1992.

The Bureau sponsored an independent technical advisory group: the National Research Council's Committee on National Statistics organized a panel on decennial census methodology in 1984 to investigate three major technical (as opposed to legal) issues: Adjustment of census counts and characteristics; uses of sampling, specifically for coverage improvement and nonresponse followup; and use of administrative records from outside the census to improve census accuracy and efficiency. The panel's 1988 report recommended research projects in these areas.

In the mid-1980's, still other national, regional, and community groups met to discuss the geographic areas to be used for data collection and tabulation; the racial and ethnic groups to be used for data tabulation and the data needs of these groups; census content; housing statistics; planning the census data products; publicity and outreach; and educational materials for schools. The Bureau staff had their own off-site conferences—two for planning in 1983-84, and two decennial census decision conferences (DCDC's) in 1985-86 that included

outside consultants and observers from other countries and from the House Subcommittee on Census and Population (the Bureau's oversight committee). The DCDC's reached key decisions about PO's, DO's, outreach strategies, etc. Two automation planning conferences in 1983-84 allowed staff to discuss options with systems experts from private firms, academia, and other Federal agencies.

The Bureau's Decennial Planning Division (DPLD, see the organizational chart on p. 6) established a number of committees and task forces, usually interdivisional in their composition. Some of them were ad hoc—dealing with specific issues that had to be resolved early (such as Federal agencies' data requirements from the 1990 census)—and others were engaged in planning through most of the decennial census period about such topics as geography, DO operations, and coverage improvement. There also were management and coordinating committees and working groups, usually reporting to the Associate Director for Decennial Census or to the DPLD, that planned major operations, such as the dress rehearsal, prec canvass, and the automated management information system (MIS).

Another important body was the Undercount Steering Committee that began meeting informally early in the 1980's under the chairmanship of the Program and Policy Development Office (PPDO). Associate directors and various division chiefs discussed issues regarding statistical adjustment of decennial census counts and offered advice. In mid-1989, with growing pressure from States and other interest groups to adjust, this committee was formalized under a new chairperson, the chief of the Population Division, and produced a detailed report in June 1991 explaining that it was technically feasible to adjust.

## Congressional Review

During the 1990 census period, the Subcommittee on Census and Population,<sup>10</sup> one component of the Committee on Post Office and Civil Service in the U.S. House of Representatives and various U.S. Senate committees (see ch. 12, and app. 12A for membership) oversaw Bureau activities, and the General Accounting Office (GAO), an arm of the Congress, evaluated and observed as well. There were more than 70 congressional hearings, over three-fourths of them before the House oversight subcommittee. The topics ranged from issues related to planning and carrying out the census (including annual funding) to excluding undocumented aliens from the apportionment counts. In addition, funds to run the Census Bureau and its programs had to be approved yearly by the House and Senate Subcommittees on Commerce, Justice, State, the Judiciary, and related agencies. As required by law to be done by April 1,

<sup>10</sup>As of January 1993, renamed the Subcommittee on Census, Statistics and Postal Personnel.

1987, the Bureau submitted the list of subjects to be covered in the 1990 census, and also as mandated, by April 1, 1988, the exact wording of the questions. (See fig. 3 for a comparison of the topics covered in the 1980 and 1990 questionnaires, and app. 1B for a facsimile of the 1990 long-form questionnaire.)

### Test and Dress-Rehearsal Censuses

The earliest testing for 1990 concerned how to approach certain major tasks. In 1981, the Bureau began exploring with the Department of Transportation and others whether existing or planned electronic navigational systems might meet the need to precisely locate rural residences geographically. Following several field tests with experimental equipment, Bureau staff decided in 1984 that there probably would be no suitable system on the market in time to be used in the 1990 census.

An address list compilation test (ALCT) in 1984 considered various alternatives for creating and updating an initial address list in urban and rural areas. One alternative was to begin with the 1980 census list itself. Although this worked well after 4 years in urban areas, the Bureau chose not to use it nationwide in 1990, primarily because the quality of the 1980 list would diminish further over 10 years, especially in high-growth areas. A proposal to contract with the USPS to create the initial lists proved too expensive. Ultimately, the Bureau decided to purchase commercially developed address lists in urban areas, have census enumerators do the listing elsewhere, and have USPS mail carriers check the addresses for coverage by matching census address cards or questionnaires with the residential addresses on their delivery routes (the "casing check").

The first two test censuses of the decade occurred in 1985, one in Tampa, FL, and the other in Jersey City, NJ. Both cities had between 220,000 and 275,000 people and contained significant numbers of people in various racial and ethnic groups. The main objectives were to study the feasibility of automating clerical functions in the local offices, collecting and processing the data concurrently instead of waiting until collection was over, trying optical mark recognition (OMR) as a way to convert responses on paper forms to digital computer records, collecting 100-percent data from all housing units first and then returning to a subsample for additional information (a "two-stage" census), and testing the effect on the mail-response rate of mailing a reminder card to nonresponse households. The OMR system and the two-stage census methodology were not found feasible, but automating some clerical functions in the DO's, concurrent processing, and reminder cards were implemented during the 1990 census.

The 1986 National Content Test (NCT) covered a variety of items in questionnaires mailed to about 50,000 households. Field interviewers visited about 8,000 households, mainly ones that returned the forms, and probed for further information to verify or explain some of the

responses. The NCT resulted in dropping the question on marital history and adding those on total years of military service, the mobility and self-care limitations of disabled individuals, monthly condominium fees, and mobile-home shelter costs.

The 1986 test censuses were held in part of a large metropolitan area (central Los Angeles County, CA) and in a rural area that included eight counties in east central Mississippi (which also contained an American Indian reservation and associated trust lands). The objectives of these tests were to (1) experiment with a metropolitan processing office separate from the data-collection office as well as an office that combined both functions, (2) try new questionnaire items, (3) measure coverage, and (4) determine if reminder cards or "motivational inserts" included with the questionnaires improved return rates.

The tribal liaison program devised for the Choctaw Reservation and its trust lands in east central Mississippi worked well (and was expanded nationally for 1990), as did offering a pay bonus as an incentive to nonresponse followup enumerators and listing addresses in rural areas using portable laptop computers. However, the computers were not used for the 1990 census, primarily because of their high cost at the time. The Los Angeles County test—especially given a mail-return rate of about 30 percent—was less successful, possibly because outreach and publicity campaigns through newspapers, radio, and television could not pinpoint the two small areas being enumerated in such a large metropolis. Finding sites for storefront offices also proved difficult, and the staff abandoned that idea for 1990. Both pre- and post-enumeration surveys evaluated coverage and estimated an undercount in the area covered by the Los Angeles County DO where the test was completed; only the postenumeration survey survived for 1990.

The accumulated test experiences led to a number of decisions:

- to automate the address control file (ACF) to control data collection and processing
- to use 11 or 12 large processing offices (later reduced to 7) to handle most mail returns and capture data while collection operations were ongoing
- to key write-in responses (as a basis for automated coding) and household surnames for followup and coverage evaluation
- to convert the questionnaire responses to computer-readable format through film and automated camera technology (FACT 90), a significant refinement of the FOSDIC system developed for the 1960 census
- to have the USPS deliver the questionnaires in mailout/mailback areas about 9 days before Census Day, and the reminder cards just 1 day before Census Day (April 1)

Figure 3. Comparison of Question Topics on the 1990 and 1980 Questionnaires

Question number	Topic or item	100-percent or sample (S) <sup>1</sup>		Question number	Topic or item	100-percent or sample (S) <sup>1</sup>	
		1990	1980			1990	1980
	<b>POPULATION</b>				<b>HOUSING</b>		
1	Name .....	100	100	H1	Coverage questions <sup>2</sup> .....	100	100
2	Household relationship .....	100	100	H2	Units in structure .....	100	S
3	Sex .....	100	100	H3	Number of rooms .....	100	100
4	Race .....	100	100	H4	Tenure (owned or rented) .....	100	100
5	Age .....	100	100	H5	Screening questions for value and rent (acreage and commercial establishment) .....	100	100
6	Marital status .....	100	100		Value of property .....	100	100
7	Spanish/Hispanic origin .....	100	100	H6	Contract rent .....	100	100
8	Place of birth .....	S	S	H7a	Congregate housing (meals included in rent) .....	100	—
9	Citizenship .....	<sup>3</sup> S	S	H7b	Vacancy status <sup>4</sup> .....	100	100
10	Year of entry .....	S	S	C1	Boarded-up status <sup>4</sup> .....	100	100
11	School enrollment and type .....	S	S	C2	Duration of vacancy <sup>4</sup> .....	100	100
12	Educational attainment .....	<sup>3</sup> S	S	D	Year householder moved into unit .....	S	S
13	Ancestry .....	S	S	H8	Number of bedrooms .....	S	S
14	Residence 5 years ago .....	S	S	H9	Complete plumbing facilities .....	<sup>3</sup> S	100
15	Current language and ability to speak English .....	S	S	H10	Complete kitchen facilities .....	S	S
16	Age screening question (items 17-33 are limited to persons 15 years old and over) .....	S	S	H11	Telephone in unit .....	S	S
17a, b	Veteran status and periods of service .....	<sup>3</sup> S	S	H12	Automobiles, vans, or light trucks available .....	S	—
17c	Total years of military service .....	S	—	H13	House heating fuel .....	S	S
18	Work disability .....	S	S	H14, H16	Source of water and method of sewage disposal .....	S	S
19	Mobility and self-care limitations .....	S	—	H17	Year structure built .....	S	S
20	Children ever born .....	S	S	H18	Condominium status .....	S	100
21a	Work status last week .....	S	S	H19	Farm residence status .....	<sup>3</sup> S	S
25	Temporary absence from work .....	S	S	H20	Cost of utilities and fuels (component of gross rent and selected monthly owner costs) .....	S	S
26	Employment status .....	S	S		Selected shelter costs for homeowners .....	<sup>3</sup> S	S
21b	House worked last week .....	S	S	H21 to H24	Monthly condominium fee .....	<sup>3</sup> S	S
22	Place of work .....	S	S	H25	Mobile home cost .....	<sup>3</sup> S	S
23a	Means of transportation to work .....	S	S	H26	Persons in unit (household size) .....	100	100
23b	Private vehicle occupancy .....	S	S	Derived <sup>5</sup>	Persons per room .....	100	100
24a	Departure time for work .....	S	—	Derived <sup>5</sup>	Gross rent .....	S	S
24b	Travel time to work .....	S	S	Derived <sup>5</sup>	Selected monthly owner costs .....	<sup>3</sup> S	S
27	Year last worked .....	S	S	Derived <sup>5</sup>	Access to unit .....	—	100
28	Industry .....	S	S	Derived <sup>5</sup>	Air-conditioning .....	—	S
29	Occupation .....	S	S	Derived <sup>5</sup>	Automobiles available .....	(See H13)	S
30	Class of worker .....	S	S		Number of bathrooms .....	—	S
31a, b	Weeks worked last year .....	S	S		Fuels used for water heating and cooking .....	—	S
31c	Hours usually worked per week last year .....	S	S		Heating equipment .....	—	S
32	Income, by type .....	<sup>5</sup> S	S		Number of living quarters at address .....	—	100
33	Total income .....	S	S		Stories in structure and presence of elevator .....	—	S
Derived <sup>5</sup>	Family size and household size .....	100	100		Van or light trucks available .....	(See H13)	S
Derived <sup>5</sup>	Family type and household type .....	100	100				
Derived <sup>5</sup>	Poverty status .....	S	S				
Derived <sup>5</sup>	Type of group quarters .....	S	S				
	Activity 5 years ago .....	—	S				
	Carpooling arrangements .....	—	S				
	Marital history .....	—	S				
	Public transportation disability .....	—	S				
	Weeks unemployed last year .....	—	S				

<sup>1</sup>"S" indicates sample subject covered only on the long-form questionnaire.

<sup>2</sup>These questions help ensure that the coverage of household members is complete.

<sup>3</sup>Significantly changed from 1980 version in concept or amount of detail.

<sup>4</sup>Determined by the enumerators. See "For Census Use" section of the questionnaire.

<sup>5</sup>"Derived" refers to items which did not appear on the questionnaire but were calculated by combining information from other items. For example, while no question specifically asks family size, family size can be determined from responses to the household-relationship question.

- to use mailout/mailback, update/leave, and list/ enumerate techniques as the principal data-collection methods (somewhat modified in the ensuing years) in 1990.

In 1987, there was just one full-scale test census; it covered 10 counties in north central North Dakota—including the Devils Lake and Turtle Mountain Indian Reservations—with a total population of about 75,000. This area had been enumerated by the “conventional” door-to-door method in 1980, and the Bureau wanted to see whether an accurate count could be obtained by a combination of mailout/mailback with telephone followup and list/enumerate (the 1990 equivalent of conventional) methods instead. (That meant having one census DO coordinating two different enumeration methods at the same time.) Postal carriers delivered individually addressed questionnaires to about 12,000 housing units in mailout/ mailback areas and about 23,000 “Postal Patron” questionnaires in list/enumerate areas. Householders in the latter were to complete and hold the forms until the enumerator visited to add the housing unit to the address list and collect any additional census information. The idea of having pockets of mail areas within conventional office boundaries was tested and adopted in modified form, for national use in 1990. Local officials reviewed housing-unit counts for the site both before and after the test, DO staff checked addresses that had been marked “vacant” or deleted, and the USPS did a post-enumeration post office check (PEPOC) to identify any housing units still missing from the census.

The Bureau selected the sites for the 1988 dress rehearsal—to test all the various operations proposed for the 1990 census to make sure they would work in a full-scale enumeration in all sorts of census environments—in mid-1986:

- St. Louis, MO (with a population in excess of 405,000), that included an inner-city area that would be difficult to enumerate
- 14 primarily rural counties (but including the city of Columbia) in east central Missouri (with more than 445,000 people and three types of enumeration areas)
- 8 counties in eastern Washington State (with a population of more than 259,000), also primarily rural but including small urban places and two American Indian reservations.

In September 1987, the Office of Management and Budget (OMB) questioned the dress rehearsal plans—notably the sampling rate—and disapproved the proposed questionnaire. Following months of discussion, research, public comment from data users, and congressional hearings, the OMB and the Census Bureau agreed to move seven housing questions from the short form to the sample form and eliminate three others from the sample form (two other sample housing questions

had been dropped earlier by the FAC). (Five of the seven questions moved from the short to the long form in the dress rehearsal returned to the 100-percent form in the 1990 census.) The OMB modified its demand to lower the sampling rate so that the national sample would not exceed 10 million households and agreed to the variable rates described earlier (averaging 1-in-6) for sampling about 17 million households.

The dress rehearsal progressed around these decisions, with the DO’s opening and closing in the summers of 1987 and 1988, respectively. The promotional campaign, particularly in St. Louis, was extensive, with radio and television programs tailored to the site. The PO in Kansas City, MO, coped well with the mailback workload; staff resolved problems with the minicomputers in the DO’s; St. Louis provided a test for improving census coverage by enumerating people in shelters and at pre-identified street sites; and there was a substantial post-enumeration survey (PES) in all three areas to evaluate the coverage of the dress rehearsal.

**Race and Hispanic-origin questions**—As part of the overall 1990 testing program to improve data on race and Hispanic-origin, the Bureau conducted a special survey in Chicago, IL, in June 1985. This informal test, involving 2,000 households, tried to obtain information needed to design the race and Hispanic-origin items for the 1986 NCT. Results from the Chicago survey and the NCT indicated that further testing of the Hispanic-origin question was needed. In 1987, the Bureau conducted a special urban survey (SUS) in six metropolitan areas, followed by a series of focus group interviews. The SUS had two questionnaire versions with different wordings and placements of these items; field representatives visited some of the households that returned the questionnaires; the focus groups—with 8 to 10 participants each—targeted Asians and Pacific Islanders in Hawaii, Alaska Natives in Alaska, Hispanics in Texas, and Blacks in West Virginia. The results from the SUS helped the Bureau decide, in January 1988, on the exact wording of the Hispanic-origin question.

In the spring of 1988, Asian and Pacific Islander (API) community leaders expressed concerns about the anticipated quality of the 1990 block-level census data for detailed API groups—i.e., for categories that would require coding write-in entries on a 100-percent basis. The Bureau’s 1990 Census Advisory Committees reflected this sentiment as well—the American Indian and Alaska Native committee wanted all tribal entries to be coded on a 100-percent basis too. The Congress subsequently directed that race items on the 1990 census questionnaire be enhanced, with two boxes for write-in responses—one for American Indian tribes and another for “Other API” and “Other race” entries, all of which could be coded. A special mail survey of urban and rural communities with high concentrations of the target populations in 1989 allowed the Bureau to refine the question format and the automated race-coding procedures.

## 1990 Census Content

The content of the 1990 census questionnaires was similar to that for 1980. (See fig. 3 for a comparison, by item.) The short form for households contained the items to be asked of all persons and for housing units, while those—plus the population and housing questions to be asked on a sample basis—appeared on the long form (see app. 1B for a facsimile).

For 1990, some of the differences in the population items from 1980 were as follows: Among the seven 100-percent questions asked of every person, stepchildren were distinguished from natural-born or adopted children and the category “grandchild” was added (item 2, relationship). Among the 26 possible sample items, the educational attainment question (12) asked for the highest grade completed (below college) or the degree earned, rather than the highest grade attended and whether completed. The question on military service (item 17) asked for the total number of years of active duty. (Individuals on active duty in the Armed Forces were asked for the first time to identify the branch of service (item 28) and their occupations (item 29).) The question asking for “weeks looking for work in the previous year” (item 31d in 1980) was dropped. The income question (item 32) requested separate data on pension receipts.

The 1990 housing items differed from those for 1980 mainly in the following ways. Several questions related to building conditions were dropped (number of dwelling units at a single address, shared entrance, number of bathrooms, air conditioning, heating equipment, water-heating and cooking fuels, number of stories, and presence of an elevator). The question on complete plumbing facilities was moved to the long form and condensed to two categories. In the seven 100-percent items for 1990, the top dollar categories for home values and rent (H6 and H7) were raised and H7 had meals added as a rent component. Among the 19 sample items, solar energy was added to the list of heating fuels (H14). A series of questions on shelter costs covered flood insurance, home-equity loans, condominium fees, and mobile-home fees.

For 1980, the sampling rate had been either 1-in-6 or 1-in-2, the latter on American Indian reservations, in counties, incorporated places, minor civil divisions, and Alaska Native Village statistical areas that functioned as general purpose governmental units with estimated populations below 2,500. For 1990, a third sampling rate of 1-in-8 was inserted for large census tracts and block-numbering areas—generally those with more than 2,000 housing units. This slightly decreased the response burden in those areas. Taking into account differences in sampling rates and their implementation, the 1990 census sampled about 15 percent of the population and 16 percent of the housing units nationwide, as compared with about 20 percent of the population in 1980.

As in the past, the estimation procedures Bureau staff used for the 1990 census required assigning weights to

individual sample person and sample housing-unit records. Subsequently, these records were stored on data files that underwent various computer edits for accuracy and consistency. For all census tabulation areas, the totals for characteristics were estimated simply by summing the weights assigned to the appropriate sample person or sample housing-unit records in ways that met specific criteria. These criteria essentially were that only one weight could be assigned to each record, the assigned weight needed to be an integer, the sample estimates of certain characteristics were to equal the 100-percent figures, and that the estimation procedure chosen would dampen the effect of any bias in sample selection. (For details, see ch. 9.)

## CENSUS GEOGRAPHY AND THE TIGER SYSTEM

### Introduction

The 1970 and 1980 censuses relied on three major geographic tools for data collection and tabulation—paper maps, digital address reference files (known as address coding guides for the 1970 census and as geographic base file/dual independent map encoding (GBF/DIME) Files for the 1980 census) for automated geocoding, and the master reference file (MRF) for reporting the geographic relationships used in census operations. These tools contained overlapping information, but there were inconsistencies among them, partly because they had been prepared in separate, complex clerical operations. For example, census block numbers might not be the same across maps, GBF/DIME Files, the MRF, and the geographic codes attached to individual questionnaires. Already aware of these problems in 1980, the Bureau sought to have for 1990 a single, nationwide, digital geographic and cartographic data base from which to produce all the required geographic products and with which to perform the geographic services of geocoding and relating geographic areas.

Following consultation with geographic information system (GIS) experts and the U.S. Geological Survey (USGS), which had some similar needs, the Bureau and the USGS formed an interagency task force in 1981. Tests showed that the Bureau could use the digitally captured data from a USGS 1:100,000-scale map to produce an acceptable large-scale census map. (The Bureau also could enhance the digital map information to include alternative street names and address ranges to facilitate its automated geocoding operations.) A cooperative pilot project in 1983, covering the entire State of Florida proved that the two agencies could jointly produce a geographic data base (the USGS's Digital Line Graph (DLG) files) for the 48 contiguous States and the District of Columbia that also would be of great value for Bureau operations. (Alaska, Hawaii, Puerto Rico, the Virgin Islands, and the Pacific island territories required special treatment.)



The Census Bureau and the USGS signed a formal agreement in December 1983 to complete a conterminous-U.S. 1:100,000-scale transportation and hydrography digital data base by mid-1987. Each of the two agencies then did part of the work on its own complementary digital production system and merged the results in a single file. Both the USGS and the Census Bureau initially encountered technical difficulties. For example, problems dealing with geometry—e.g., when the system produced extraneous lines or gaps in line segments—often required new software, procedural changes, and consequent rerunning of data sets, complete with quality-assurance operations, while others were solved as the staffs gained experience.

At the Census Bureau, this digital data base became the Topologically Integrated Geographic Encoding and Referencing (TIGER) System, from which the staff produced geographic materials for the census and public-use products (see pp. 31 ff.) marketed under the TIGER trademark. (The USGS sold digital data to the public from its own data base, marketed as DLG files.) The USGS used automated scanning techniques to “digitize” (make computer-readable) its 1:100,000-scale maps, each of which consisted of four layers (roads, water features, railroads, and miscellaneous transportation features). The USGS then gave the Bureau the digitized information, with feature classification codes (such as “lake” or “stream”) and some unprocessed road data. The Bureau assigned feature classification codes (such as “freeway” or “city street”) to those road data and sent the updated computer tape file to the USGS. After further improvements, the USGS returned the file to the Bureau, which enhanced it with information from the 1980 census—street names, the address ranges covered by GBF/DIME Files, block numbers, governmental unit boundaries, and governmental unit and statistical area identifiers.

In their “GUS” (geographic update system) sites, staffs in the Bureau’s 12 RO’s (in the RCC’s during field operations) compiled map-update information from local sources. Other employees used microcomputers at four “field digitizing sites” (located in the Atlanta, Boston, Dallas, and Denver RO’s) and at the Data Preparation Division (DPD) in Jeffersonville, IN, to translate this information to 8-inch “floppy” magnetic disks for further processing by the Geography Division at headquarters. (The staff in the DPD also added the 1980 geographic area boundaries and codes.) Geography Division staff converted GBF/DIME Files into the format needed for the TIGER System, inserted census county division and other legal and statistical boundaries, obtained and added voting-district information (for use in supplying data under Public Law 94-171; see p. 36), updated information from the GUS sites, assigned new block numbers for 1990, and so forth. As in the past, the Bureau involved State, local, Alaska Native, and American Indian tribal officials in cooperative programs to delineate, review, and update the boundaries for legal and statistical entities in their areas.

In the fall of 1987, the Bureau produced the first field map sheets from the TIGER System for the 1988 dress rehearsal and other precensus activities (such as prelisting), using high-speed, low-resolution electrostatic plotters. Ultimately, there were more than 600,000 such map sheets generated for enumeration purposes during the decennial census period. (After the census, the Bureau prepared computer map files that the RO’s used to produce electrostatically plotted map sheets for sale to customers who had 1990 census data products (summary tapes, compact discs, census tract street indexes, or printed reports for census tracts and block numbering areas.) The Bureau later prepared the film negatives required for publishing the limited number of maps that appeared in printed 1990 census reports. The vast majority of these “publication maps” were monochromatic; a very small number, notably the thematic ones, were multicolored.

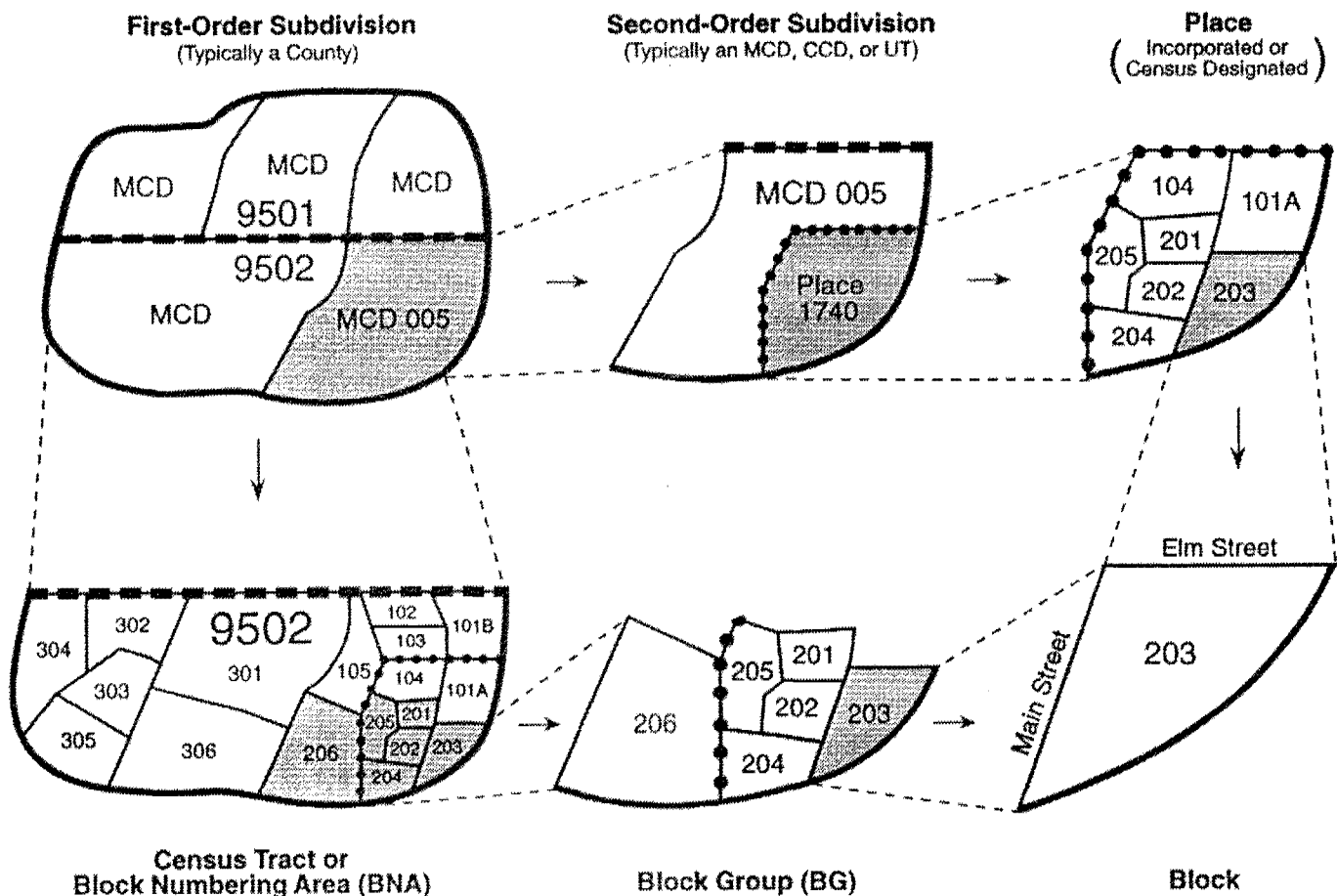
### Expansion of Geographic Programs

The GBF/DIME Files from the 1980 census, that covered the urban cores of 345 metropolitan and other highly developed areas, included about 60 percent of the Nation’s population but only about 2 percent of its land area. At the most detailed levels of tabulation, the 1980 census had about 43,700 census tracts, 156,163 whole block groups, and 2.5 million census blocks. Outside the areas for which the Bureau published data by block group, the lowest level was the enumeration district (ED), with data actually published for around 102,000.

The TIGER System expanded the detailed tabulation capabilities for 1990 to a file that covered the entire Nation with nearly 7 million census blocks. For areas without locally established census tracts, the Bureau worked with State and local agencies to identify approximately 11,600 block-numbering areas (BNA’s)—up from 3,400 in 1980. The number of block groups—combinations of census blocks within census tracts and BNA’s—rose from about 156,000 in 1980 to around 230,000 whole block groups and 363,000 tabulated parts, that replaced the mixture of BG’s and ED’s used for tabulation purposes in the 1980 census. (See fig. 4.) The ED equivalent for 1990 data-collection operations—generally the workload for a single enumerator—was called an “address register area” (ARA). There were both “collection blocks” and “tabulation blocks.” Collection blocks used mainly roads and other visible physical features as boundaries. Tabulation blocks sometimes “split” these collection blocks to reflect legal, and occasionally statistical, boundaries when the boundaries for geographic entities for which the Bureau tabulated data did not coincide with the collection block boundaries. Special operations in the RCC’s and DO’s identified how the addresses in the collection blocks were to be assigned to each tabulation block (see “Block Splits,” p. 23).

For both published reports and computer files, the Bureau provided area measurement information for

Figure 4. Small-Area Geography in the 1990 Decennial Census



virtually every type of geographic entity, from the census block up. For the 1990 census, the Bureau calculated all U.S. water areas (i.e., inland, territorial, coastal, and Great Lakes), not just inland water as in the past, so the total area reported for coastal and Great Lakes States increased substantially.

Some other changes to previously recognized geographic entities also occurred during the decade:

- The census region known as “North Central” was renamed “Midwest” in June 1984.
- In June 1983, the Office of Management and Budget changed both the name and the criteria for its “standard metropolitan statistical areas” (SMSA’s) and “standard consolidated statistical areas” (SCSA’s) to a generic classification known as “metropolitan areas” (MA’s) consisting of two major components—“metropolitan statistical areas” (MSA’s) and “consolidated MSA’s”

(CMSA’s), the latter composed of two or more “primary MSA’s” (PMSA’s).<sup>11</sup> As of June 1990, there were 268 MSA’s, including 4 in Puerto Rico and 21 CMSA’s, including 1 in Puerto Rico. These CMSA’s contained 73 PMSA’s, including 2 in Puerto Rico.

- The 1980 census published data for 209 Alaska Native villages (ANV’s) recognized under the Alaska Native Claims Settlement Act. The legal boundaries of these villages included vast, uninhabited areas that were not meaningful for understanding Alaskan settlement patterns, so for 1990, the Bureau worked with

<sup>11</sup>A metropolitan statistical area (MSA) consisted of one or more contiguous counties that contained a city of 50,000 or more inhabitants or contained a Census Bureau-defined urbanized area and had a total population of at least 100,000 (75,000 in New England cities and MCD’s). (Urbanized areas included only densely settled territory whereas an MSA was composed of complete counties and often contained extensive rural territory.) A consolidated metropolitan statistical area (CMSA) was an MSA with a population of 1,000,000 or more that contained two or more contiguous areas, each of which was designated as a PMSA and demonstrated strong internal economic and social links in addition to close ties with the central core.



the 12 Alaska Native regional corporations (ANRC's)<sup>12</sup> to establish boundaries for 217 Alaska Native village statistical areas (ANVSA's), which the 1990 census recognized as geographic entities in its data tabulations.

The 1980 census identified areas that contained American Indian tribal trust lands but did not publish the data for them until late in the decade. For 1990, the Census Bureau obtained from the Bureau of Indian Affairs boundaries for both tribal and individual trust lands and tabulated data for them (and for all American Indian reservations) in the regular report series. Federally recognized tribes in Oklahoma were given the opportunity to delineate tribal jurisdiction statistical areas (TJSA's) for 1990; these replaced the "Historic Areas of Oklahoma (excluding urbanized areas)" used to report data for several tribal groups in the 1980 census. A total of 17 TJSA's (15 separate TJSA's and 2 overlapping areas) were defined for the 1990 census. For 1990, Federally and State-recognized tribes outside Oklahoma that did not have a land base were given the opportunity to delineate tribal designated statistical areas (TDSA's). Altogether, 19 tribes participated and designated TDSA's.

- The 1980 census "election precincts" became "voting districts" for 1990 (more than 147,000, plus 1,600 in Puerto Rico); they included State-identified election districts, precincts, legislative districts, and wards.

## ADDRESSES AND QUESTIONNAIRES

### Address Control File

As noted earlier, an original goal for the 1990 census was to build a single automated system that would control everything having to do with maps, addresses, geographic relationships, and geocoding. By 1988, however, Bureau staff found this impractical; there were too many technological, logistical, fiscal, and time constraints to have it done, tested, and operational in time for 1990. Instead, there had to be a separate address control file (ACF), and the Bureau started building it in July 1988. The ACF system reflected a national inventory of housing units and created listings for precensus data collection and postcensus data processing and evaluation operations. It produced mailing labels for the household questionnaires and controlled the questionnaires' flow through data collection and processing. The ACF and TIGER Systems interacted; the ACF system used information from the TIGER files, and RO staff corrected or updated the latter when the DO staffs and enumerators discovered discrepancies.

<sup>12</sup>There was a thirteenth ANRC established for Alaska Natives who were not permanent residents of Alaska and who chose not to enroll in 1 or the 12 ANRC's. Because no geographic territory was associated with this thirteenth ANRC, the Bureau did not prepare any census products for it.

## Address-List Compilation

Experience in the 1984 address-list compilation test revealed that commercial address lists, suitably updated by a combination of census field staff and USPS address checks, were a more cost-effective source of mailing addresses than updated 1980 address lists or USPS mailing lists. Commercial lists were particularly useful provided (1) the Bureau had a computerized geographic file for the area to assign each address to the appropriate geographic entities, (2) the vendor had a computerized residential address list, and (3) the area received USPS city delivery service. The Bureau purchased computerized residential mailing lists for a number of predominantly urban mail delivery areas; these were called tape address register (TAR) areas. Thus, 423 of the 449 stateside DO's had one or more TAR areas within their boundaries. TAR areas covered about 55.7 percent of the Nation's housing units. Where the Bureau did not have the address-range information it needed for automated geocoding and in the absence of city-style (house number/street name) addresses, it compiled its own computerized files of residential mailing addresses through an operation called "prelisting" (see below) that accounted for another 38.7 percent of the Nation's addresses. (The list/enumerate (L/E) census procedure took care of the remaining 5.6 percent of the housing units outside the TAR and prelist mail areas.)

In 1987 and 1988, the Census Bureau procured commercial files and generated label tapes for some 55 million TAR addresses. A contractor then printed these on cards for the USPS to verify in an advance post office check (APOC 1) between August and October 1988. That check of "adds," "deletes," duplicates, etc. led to a net increase of about 2.6 percent to the original vendor files at a cost of around \$0.12 per address. The Bureau then geocoded these addresses using its TIGER data base in several cycles and created ACF's. In May and June 1989, the Bureau checked all the TAR addresses again through a field operation called "precanvass." Enumerators (whose work was subjected to a quality-assurance procedure that suppressed some of the ACF addresses) verified the ACF information and personally made inquiries at specific addresses. They added about 6 million more addresses before their annotated address listings and maps were shipped to several of the 1990 census PO's for further work, including updates to the ACF and TIGER data bases.

Prelisting nationwide occurred in two phases—in the summer/fall of 1988 and in the fall of 1989—generally where there was no TAR or where an area designated for L/E had some "pockets" of concentrated population that received USPS city delivery. Twelve of the 13 RCC's, excluding San Francisco, supervised the 1988 prelist. As a quality-assurance check, advance listers visited some of the address register areas (ARA's) ahead of the prelisters and compiled listings for selected blocks. Prelist crews then marked maps with the locations of addresses and map updates and listed addresses

for their ARA's by hand; clerks in the RCC's edited these materials and shipped them to two of the PO's for keying into computerized prelist (nearly 27.8 million housing units) and special-place (about 84,000 facilities) address files between August 1988 and January 1989.

The 1988 prelist, planned for 32 million housing units, actually listed about 27.8 million housing units. Due to the problems of creating an accurate mailing list for some rural and seasonal housing areas of the country (primarily in the South and Midwest), some previously designated 1988 prelist areas were redesignated as 1989 prelist areas to be enumerated by update/leave (U/L—or mail back only) procedures rather than complete mailout/mailback. The rest of the 1989 prelist (again with advance listing) covered areas where the Bureau already had anticipated mail-delivery problems because of the address systems—rural and other mail routes, post office boxes, or general delivery. The 1989 prelist covered approximately 10.2 million housing units on some 1.36 million blocks. The listings were routed as in 1988, but to four PO's (now open), where they were keyed in November and December 1989.

The APOC for the 1988 prelist operations was done as for APOC 1, but in two phases, APOC 2 (late January to mid-February 1989) and APOC 3 (late March to mid-April 1989), because some returns were later than others. The 1989 prelist addresses did not undergo an APOC because the Postal Service would not be delivering the questionnaires; DO enumerators would do that. Bureau staff in certain DO's, designated as master DO's (MDO's), verified and geocoded the resultant APOC "add" cards, and field crews resolved discrepancies and other cases where addresses were in doubt. Again, clerks in the PO's keyed adds or changes to the ACF's, and the RCC's processed the annotated maps.

Adding missed mailing addresses and assigning them to the proper geographic entities were both major operations. USPS mail carriers identified about 2.9 million potentially new addresses when they checked census addresses against their routes. Of these, field verification by DO personnel determined that approximately 21 percent were new addresses.

During APOC reconciliation, the field staff added nearly 1.2 million<sup>13</sup> addresses that were not already in the census files. These added units included addresses verified by enumerators as well as missed addresses.

As the ACF was being updated based on the USPS and prec canvass checks, the Bureau used the completed portions to generate files for addressing questionnaire packages for delivery.

<sup>13</sup>This estimate, and those in the preceding paragraph, were derived from samples and, as a result, have sampling errors associated with them. While sampling errors are not reported in this chapter, they are discussed in, 1990 Census of Population and Housing, *Evaluation and Research Reports, series 1990 CPH-E*.

## Questionnaire Production and Mailing

The OMB authorized the 1990 census household questionnaires following congressional approval of their content and wording. Aside from changes in content described earlier, the major innovation for 1990 was in printing: computerized inkjet printing equipment allowed the contractors to print a housing-unit address and bar code directly on each questionnaire, so that it no longer required a separate labelling operation. The return envelopes were imprinted with a special nine-digit ZIP Code and a POSTNET bar code for the Postal Service to use in sorting and delivering the completed questionnaires to the appropriate census DO or PO.

In February 1989, the Government Printing Office (GPO) let a \$17.5-million contract to one private printer to produce, address, and assemble the short-form initial mailing packages. In March 1989, the GPO awarded a \$7.5-million contract for the long-form mailer to a consortium of three firms; each of them took a particular production step. All of this work was subjected to quality assurance (QA) procedures. The Bureau delivered computer tapes containing the addresses to the contractors, the bulk in mid-October 1989, and the rest by mid-February 1990. Including open, unaddressed packages to be used for additional mailings and blank questionnaires for the enumerators, the contractors produced and shipped over 95.3 million short and 19.6 million long forms, principally between late October 1989 and mid-March 1990.<sup>14</sup> (Some blank forms for training kits were printed as early as June 1989.)

Postal dispatching of the mailing packages began in late February 1990, and most post offices made their initial deliveries to the public on March 23. They followed this on March 30 with mail reminder cards to all mailout/mailback and update/leave residential addresses. Over all, the USPS found that it could not deliver about 4.8 million questionnaires; census employees eventually delivered about 1.8 million of those. (For data collection, see p. 21ff.)

## CENSUS PROMOTION CAMPAIGN

The thrust of the 1990 census promotional program was to encourage mail response, reduce the differential undercount, and foster a positive atmosphere within which to take the census—to convince people that the census was both important and safe.

The Bureau's assistant director for decennial census assumed formal responsibility for the 1990 publicity and outreach programs in February 1987, but internal planning, which involved a high-level Department of Commerce committee, dated back to January 1983. External consultation began in 1984 with dozens of local public meetings (LPM's) cosponsored by interest groups—

<sup>14</sup>For more information on the number and types of forms printed for the 1990 census, see chapter 4 of this *History*.

chambers of commerce, minority organizations, cities, and the like—as well as conferences with Federal agencies, church leaders, and American Indian tribal authorities, to name but a few. Inside the Bureau, the Decennial Planning Division (DPLD) coordinated the outreach as it evolved through the Field Division's Census Awareness and Products Program (CAPP) and its census community awareness specialists (CCAS's) at the local and regional levels beginning with the test censuses, and in the 1990 Census Promotional Office (CPO, founded in 1987) at the national level. Other units, such as the Data User Services Division (DUSD) and the Congressional Affairs and Public Information Offices, had their particular functions here as well.

As for the 1980 census, the Advertising (Ad) Council sponsored public-service advertising in the print and broadcasting media as a “pro bono” project for its industry. The firm of Ogilvy & Mather again developed the general campaign, but new for 1990, the Ad Council used the services of four minority advertising agencies to reach Black, Hispanic, Asian and Pacific Islander (API), and Puerto Rican audiences. The Institute of American Indian Arts fashioned promotional materials specifically for American Indians and Alaska Natives. All these organizations devised slogans, posters, buttons, flyers, and audio and video tapes. There also were “kickoff” events for the various groups; for example, MCI Communications was the host for the National Telephone Bank kickoff, where 100 leaders of API nationality organizations came together on March 27, 1990, to unveil the census's nationwide telephone assistance system.

The National Association of Broadcasters (NAB), as it had for 1980, formed a census committee to ensure participation by television stations, but for 1990 added radio stations as well. Having tripled in size since 1980, cable networks (with 50 million subscribers) also had an important role. Private joint ventures supplemented the Ad Council's efforts: Over 400 national corporations and membership organizations lent their widely varied communication channels, so that the census message appeared on milk cartons, utility bills, and envelopes; in product advertising; company newsletters and magazines; and so forth.

Inside the Bureau, the CPO produced some 580 print audio/visual items, of which 190 were “core products”—mainly in information kits for churches, schools, and the media—for production and mass distribution between January and March 1990. A press office within the CPO wrote and released dozens of press releases and responded to hundreds of press inquiries.

The National Services Program (NSP), managed by the DUSD, was the primary contact with over 300 national nonprofit organizations that represented racial or ethnic communities or other special populations, notably the ones that had been undercounted in previous decennial censuses. While the NSP operated, as it had in the past, through exhibits, presentations, and

workshops at these organizations' meetings, its new approach for the 1990 census was the “decision maker meeting” (DMM). These meetings were explorations in 1988-89 between top Bureau officials and organization leaders to see how their particular groups might actively participate in the census. Each DMM specifically sought official resolutions of endorsement and mailing lists of regional and local affiliates that the national body would encourage to work with local CAPP staffs on promotion and recruitment.

The CAPP staff, as indicated, operated at the community level, with particular attention to traditionally undercounted areas. After receiving intensive training in communication skills, dealing with the media, and on local issues, they set up exhibits, conducted workshops, and made presentations beginning with the test censuses in 1985. That date for CAPP was much earlier than for 1980 (when it was organized in 1978), and with many more people—about 260 temporary employees at the 1990 peak compared with 200 for 1980.

Local government outreach projects started about 2 years before Census Day, sometimes with a certain amount of overlap. There were, for example, the mayors' cooperation program that targeted the heads of around 100 cities—35 key cities plus at least one more in each State. The Bureau also had 19 regional meetings with mayors and other local officials in 1988 and 1989 to involve them in the census. There were some 2,200 volunteer “complete count committees” formed of influential government officials and community leaders who planned and implemented local publicity and outreach activities. The State data centers (SDC's)—part of a Federal/State/local cooperative program that the Bureau began in 1978—in all 50 States, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands contributed to the outreach effort through more than 200 participants. The Field Division's liaison programs for American Indian tribes and Alaska Native villages had outreach and recruiting among their many responsibilities.

The Census Education Project (CEP) was the DUSD's major outreach assignment for 1990; it was designed to involve elementary and secondary educators (kindergarten through 12th grade) by supplying kits of classroom materials from which they could teach about the census and then have their students carry the message and knowledge to their homes. The CEP distributed nearly 375,000 English-language kits, plus 65,000 in Spanish, and promoted their use through press releases, exhibits, workshops, education media/association publications, and special events and contests involving textbook vendors, among others. Followup revealed that schools with high minority-student enrollment made widespread use of the K-12 kits, but “general population” schools, less so. A CEP college edition did not progress past the draft stage due to a lack of funding and staff, but in 1986-87, senior Bureau officials visited 72 historically Black colleges and universities to establish what was hoped would be beneficial mutual relationships between

the schools and their communities by participating in the census and benefiting from its results. The Bureau made similar approaches to public-housing authorities and tenants' associations, the National Head Start Association (a nonprofit protection and advocacy organization for children and families) and the Head Start Bureau, which served about 464,000 families. A similar project was aimed at migrant farmworkers, with promotional materials mailed to 104 organizations.

The Religious Organizations Project targeted three major audiences: The general population, through mailing religious "talking points" to churches nationwide; the Black population, through a partnership with churches and selected fraternities; and the Hispanic population, through a partnership with the National Conference of Catholic Bishops' Secretariat of Hispanic Affairs. The objective was to have national organizations encourage support among individual congregations by allaying fears about the census; help in recruiting for temporary census jobs; provide space for testing, training, and walk-in assistance centers; and publicize the census from the pulpit and in bulletins, newsletters, and promotional handouts. Black churches distributed more than 300,000 copies each of six kinds of educational and promotional materials; Hispanic bishops appeared in key Spanish-language public-service announcements (PSA's) on television.

Other outreach efforts had to do with particular census needs. From June 1987 through August 1990, Bureau staff contacted State employment agencies and minority organizations to recruit temporary census workers, and between January 1988 and August 1990, placed classified ads in the print media and sought PSA's on radio and television. Word of mouth was an effective no-cost form of advertising to identify candidates for 1990 census jobs. Publicity in the media led particular respondents to telephone or to walk-in multilingual questionnaire assistance locations. Another facet of that publicity—new for 1990—came ahead of or with the mailed census questionnaire itself. In areas where language and other barriers might make enumeration difficult, an "early alert" flyer in English, Spanish, and six Asian languages told householders about the importance and confidentiality of the questionnaire they would receive shortly. Two days before Census Day, postal carriers delivered reminder cards to all households, and then the questionnaire mailing package itself contained a motivational insert. It had graphics in color and listed reasons to be counted in the census.

The "Thank You America" Program, after the census, ran from the summer of 1990 to the spring of 1992. In it, the Bureau distributed crystal bowls, plaques, and certificates of appreciation to individuals and organizations that had made significant contributions to the 1990 census. Staff mailed final population counts to the highest elected officials of over 39,000 local governmental units, and later sent them the appropriate *Summary of Population and Housing Characteristics* (1990 CPH-1) reports.

Compared with the estimated \$38 million worth of commercial advertising the Bureau received free for 1980 (in 1980 dollars), an audit placed the 1990 figure at about \$66.5 million (in 1990 dollars). Local TV and radio stations were responsible for 69 percent of that value, followed by 21 percent for ethnic media, including Black, Spanish, and API outlets. The PSA campaign reportedly reached a potential total audience of 99 percent of the adult population aged 18 or older, with an average of 68 exposures per person.

The total expenditure for promotion and outreach in the decennial cycle was \$72,698,000, or 2.9 percent of the total 1990 census cost.

## DATA COLLECTION

### Overview of Census Methods

For 1990, the U.S. postal system again was the preferred method of taking the census where there were house-number/street-name addresses in the 50 States and the District of Columbia. Elsewhere, in sparsely settled parts of the country or in Puerto Rico, the Virgin Islands, or the Pacific island territories, enumerators had the primary role. The three basic ways of taking the census of housing units and their occupants were as follows:

- **Mailout/mailback (MO/MB).** Based on a master address list (called the ACF, see p. 18), the Bureau mailed preaddressed short- (100-percent) or long- (sample) form questionnaires to about 86.2 million housing units, asking the occupants to complete the forms and mail them back.
- **Update/leave (U/L).** Enumerators visited 10.3 million housing units, verified the addresses, and left questionnaires for the nearly 25 million occupants to complete and mail back to a census DO.
- **List/enumerate (L/E).** USPS letter carriers delivered advance census reports (ACR's—unaddressed, short-form household questionnaires) to people who received their mail at post offices or on rural routes. Enumerators visited the housing units (5.7 million in the States), listed them in their address registers, collected the ACR's, and asked additional questions where the units were designated to receive the sample long form. In previous censuses, this was called the "conventional" or "door-to-door" method.

These methods sometimes varied to accommodate particular situations, for example, urban update/leave (UU/L) for public housing developments and urban update/enumerate (UU/E) for census blocks consisting almost entirely of boarded-up buildings. "Special place operations" covered people not living in housing units—those in group quarters, in the military, on ships, overseas, or with no usual residence (see p. 26).

## Field Organization

The Field Division (FLD) at Bureau headquarters in Suitland, MD, had direct responsibility for almost all data-collection operations. For 1990, it established a temporary network of 13 regional census centers (RCC's; see p. 4) and 463<sup>15</sup> district offices (DO's)—up from 418 for 1980. The RCC's (headed by assistant regional census managers (ARCM's) who reported to the regional directors) began operating in late 1987, and within 2 years, were giving administrative, recruiting, automation, procedural, and geographic support to around 40 DO's each.

The 449 stateside DO's opened on a staggered schedule: Early in 1989, 109 master district offices (MDO's) began precensus operations, such as the 1989 prelist and the advance post office check (APOC). The basic district offices (BDO's) followed, clustered around the MDO's from late 1989 until early 1990. Some of the MDO's remained open after the BDO's closed in late 1990 to cope with such postcensus activities as block splits and local review (see pp. 23). In Puerto Rico, the nine DO's came under an area office in San Juan that reported to the New York RCC; headquarters staff, working through the local governments, supervised the DO's in the Virgin Islands and the Pacific island territories.

Stateside, each DO covered an area with approximately 236,000 housing units and 557,000 inhabitants, and was usually one of five types:

1. Similar to the "centralized" offices of the 1980 census, these 103 DO's were in large central-city and metropolitan areas containing about 175,000 housing units that were judged to be difficult to enumerate.
2. These 197 DO's (similar to the "decentralized" offices of 1980) had less complicated mailout/mailback assignments of about 260,000 housing units each, generally in smaller metropolitan areas and in suburban or even non-metropolitan areas.
- 2A. Seventy-nine DO's were similar to type 2's in their assignments, except that they tended to be in the South or Midwest, where there were more rural-route addresses and seasonal populations. The average workload was 270,000 housing units.
3. These 70 DO's, with about 215,000 housing units each, were in sparsely settled parts of the West and North, where the collection method varied from mailout/mailback to list/enumerate. These DO's were similar to the "conventional" offices in 1980.

4. In addition to the 449 operational DO's, there were 38 offices established primarily for outreach, administration, and training. These were new for 1990, and helped assure the census "presence" everywhere.

All DO's were fairly uniform in organization, having a district office manager (DOM) as its principal spokesperson to the public, the media, and government officials; assistant managers for office operations, electronic data processing, administration, and field operations; recruiting, field operations, and special-place supervisors; a census community awareness specialist (CCAS); crew leaders and enumerators; and office clerks.

## Recruitment, Training, and Payrolling

A major recruiting goal for 1990 (as in earlier censuses) was to have an indigenous workforce—one that was representative of the local labor force with respect to race, ethnicity, and language. Nationally, the census met that goal, with almost 33 percent of the field force coming from minorities, nearly twice their representation in the 1980 civilian labor force (the base for calculating). The Bureau also tried to hire enumerators to work in the areas where they lived. Finding qualified local applicants was not always successful, so "strangers" had to be brought in on occasion.

The national unemployment rate during the 1990 census cycle generally was about half of what it was for the 1980 round, making recruitment for temporary census jobs difficult in most parts of the country. Nevertheless, with much advertising and the help of State employment agencies, civic organizations, minority and women's groups, churches, and other sources, the Bureau recruited and tested approximately 2 million applicants for around 552,000 temporary stateside field positions. (For 1980, the comparable figure was about 460,000.) About 302,000 employees worked during the peak field activities. In 1989, a Presidential waiver (as for 1980) allowed the Bureau to use a supplemental, bipartisan political referral system to fill some temporary positions, and two congressional acts exempted Federal and military retirees from pay or annuity offsets if they worked on the 1990 census. Four Federal agencies with assistance programs similarly relaxed rules for their benefit recipients.

Applicants had to meet certain specifications, such as citizenship (generally required), physical fitness for the particular job, minimum age (normally 18), and lack of a criminal record, and they were asked about their education and language skills. Once favorably screened, applicants had to pass a written test, called a "selection aid," that covered arithmetic, map reading, and ability to understand directions in English, and a structured face-to-face or telephone interview. DO selection clerks checked references as necessary. The standard practice was to hire the applicants according to their ranking

<sup>15</sup>These 463 DO's included 449 stateside operational DO's, 9 DO's in Puerto Rico, 1 in the Virgin Islands, and 1 in each of the Pacific island territories (American Samoa, Guam, the Northern Mariana Islands, and Palau). The Bureau established 38 additional stateside offices to conduct outreach and training activities.

in the test scores, but circumstances sometimes dictated selecting people for their language skills or association with the particular populations they were to cover. Part of the recruiters' task was to encourage people to apply for census jobs despite their limited English or hesitancy about working for the Government. All hirees had to take an oath of office that included a promise not to disclose any census information (confidential under Title 13, U.S. Code) either during or after employment.

As in the past, the Bureau used a "pyramid" system for teaching—managers, having learned, taught their supervisors, who then repeated the process for their own workforces. Training was as uniform as possible nationwide, varying only by type of enumeration, and relied heavily on videotapes—a technological improvement over the earlier filmstrips—and verbatim guides that trainers read aloud to their classes. Employees had self-study materials to complete before they began work, and referred to manuals while carrying out their assignments. Management relied more on "on-the-job training" (OJT) than heretofore. Crew leaders, for example, would accompany individual enumerators on their earlier rounds and give them immediate instruction as needed. The time taken up in training varied according to the complexity of the job and the knowledge required. DO managers spent several weeks in classes and workshops, with topics ranging from geography to media relations; enumerator training took anywhere from 1/2 day to 4 1/2 days, and crew leaders a day longer to include supervisory instruction.

Full-time census employees, such as those detailed from headquarters or in RCC or DO management, were paid every 2 weeks and earned annual and sick leave. Intermittent employees, who did not have regularly scheduled tours of duty, did not accrue annual or sick leave but received paychecks every week based on their daily pay (which depended on the particular job they were doing at the time) and work records. DO employees were paid by the hour. The rates varied according to local situations—difficulty of enumeration, shortages of recruits, and competitive wages; an enumerator could earn anywhere from \$5 to \$10 an hour, while clerks received \$4.50 to \$7. The Bureau raised decennial pay rates for DO employees before the census started, and again in June 1990 in certain DO's where there were staff shortages and recruiting qualified people was a problem. There also was a supplemental pay program throughout the 50 States and the District of Columbia to motivate and retain workers and stimulate production and quality. An enumerator, for example, might receive \$50 or \$100 extra for satisfactorily completing training and turning in at least 50 cases, plus \$1.50 per case. Enumerators and other people who had to drive their own vehicles on official business also collected \$0.24 a mile for that, and were reimbursed for tolls, parking, official telephone calls, and the like.

## Block Splits

The block split operation was an integral part of the conversion from data collection to data tabulation geography. To assist enumerators in locating and canvassing their assigned areas, collection geography boundaries usually consisted of visible features such as roads, rivers, or railroads. Tabulation areas were the legal or statistical entities for which the Bureau tabulated final results. While the boundaries of many tabulation areas coincided with collection boundaries, many others did not.

The block split operation consisted of staff in the DO's and RCC's assigning each housing unit and group quarters in a collection block split by a tabulation boundary to the proper tabulation block. For example, collection block 110 might have been split into blocks 110A for the part in a city and 110B for the part outside the city boundary. Each living quarters in collection block 110 would be reassigned to either tabulation block 110A or 110B. (See chs. 3 and 6 for more detailed discussions of block splits.)

## Local Review

"Local review" was a census coverage-improvement program in which local government officials in the States, the District of Columbia, and Puerto Rico received copies of census maps and housing-unit counts by block, compared their own housing-unit counts (from administrative records) with those of the census, and reported any discrepancies they perceived. The Bureau reviewed the reports, investigated as necessary, and corrected the population and housing-unit census counts (if warranted) before the DO's closed.

The 1980 program had local officials check the census counts of housing units for each ED once, before they became final. Originally, the officials were to make these comparisons with the Bureau's estimates before the census began, as well as at the end, but the first phase had to be dropped in February 1980—less than 2 months before Census Day—because of delays in the production of the data and accompanying maps. Many of the participating local officials complained that the time allotted was far too short, and that counts by ED did not allow for effective identification of errors.

For the 1990 census, the preparations needed to implement the two-phase program were in place by late 1986 (roughly 2 years earlier than for 1980): Approximately 20,000 governmental units (GU's) in mailout/mailback areas were invited to participate in phase 1 (precensus), and about half of them appointed liaisons for this purpose. The Bureau solicited help from all 39,000 governmental units for phase 2 (postcensus), and mailed an information booklet to each of them. Between the fall of 1987 and the spring of 1988, there were training workshops nationwide for all officials interested in participating, and all GU's received technical



guides in June 1989. That same spring/summer, the Bureau mailed copies of the block-numbered precensus maps to all local and tribal governments. Those eligible for phase 1, because the GU was in a mailout/mailback area where the ACF provided precensus housing-unit counts, could use these maps to prepare housing-unit and group-quarters estimates for collection blocks; others used them to prepare local estimates by block for phase 2 (postcensus). Roughly 16 percent of the phase 1 participants commented during the winter of 1989-90, resulting in the addition of more than 438,000 housing units to the ACT.

At the end of August 1990, the Bureau mailed phase 2 listings and postcensus maps to every GU. These listings showed the number of housing units and the GQ population (but not the household population) for each block, plus a population count for the GU. The DO's accepted responses through October 5, 1990. About 25 percent of the GU's (including all of the 51 largest cities in the country) responded, and the Bureau recanvassed all challenged blocks where the local count was higher by two or more units or lower by more than five units, and any blocks with GQ challenges. The recanvass covered blocks containing about 5.5 million housing units—about 5 percent of all units—and addressed most of the housing-unit concerns raised by local and tribal officials. (Phase 2 also received widespread attention in the news media.)

### Data Collection in Mail Census Areas

Refined through the tests and the dress rehearsal, the 1990 census used a mailout/mailback technique to enumerate about 207.4 million people in about 86.2 million housing units that could be identified through specific addresses to which USPS carriers could deliver mail. In a modification of the mail technique called "update/leave" (U/L), census enumerators checked addresses and left questionnaires at another 10.3 million housing units (containing about 25 million people) to be completed and mailed back.

Almost all the census DO's (see p. 21) had mailout/mailback areas within their jurisdictions. The procedures used for handling mail returns differed by DO type: For type 1 DO's, the returns were addressed to one of the PO's instead of the DO. The PO's checked them in, edited them, and made telephone calls to collect missing information; they referred cases to the DO's only where an enumerator had to visit. All other types of DO's (2, 2A, and 3) received the mail returns and generally performed most of those ensuing functions themselves before sending the accepted questionnaires on to the PO's for the further steps needed to transfer the data to magnetic tape. (See "Data Processing" on p. 28.)

Most of the DO's also offered questionnaire assistance to the public by toll-free telephone. Particularly where translation was necessary, all seven PO's supplied telephone help in English and Spanish, and the

San Diego PO had operators who could speak any of six Asian languages. While anyone could visit a DO for personal help, most of the type 1 offices had community-based walk-in centers and even a few mobile centers as well. (See ch. 6.) As in 1980, all the mailed or delivered English-language household questionnaires used in the 50 States and the District of Columbia contained a message in Spanish telling the recipient how to obtain a Spanish-language questionnaire. For 1990, this message included a "1-800" telephone number to call. Enumerators carried both English and Spanish versions for use as needed.

**Mail response and return rates**—The staff calculated the mail **response** rate by dividing the number of mail returns by the total mailout, with the denominator including vacant and nonexistent as well as occupied units. The result affected budgeting and staffing for followup and other operations. The Bureau had based its 1990 budget on an anticipated 70-percent response rate; as of April 18, 1990, the national rate was 63 percent, and nonresponse followup had to be planned using that figure. (By May, the national rate reached 66 percent.) Given this shortfall, the Congress appropriated an additional \$110 million in May to pay for the larger workload.<sup>16</sup> As in the past, nonresponse was greatest in the type 1 DO's where enumeration was most difficult.

The mail **return** rate—a measure of public cooperation—represented the number of mail returns from occupied units only. Here, the Bureau expected a 78-percent return rate for 1990, approximately 5 percentage points lower than the 1980 return rate. The return rates for 1990, compared with those for 1980, were as follows:

	1990	1980
Overall	74.1%	83.3%
Short form	74.9%	83.6%
Long form	70.4%	82.0%

(For details, see chapter 6.)

**Questionnaire edit**—Clerks in all but type 1 DO's reviewed the returned questionnaires for completeness. They mended or transcribed damaged forms, made sure all the appropriate FOSDIC circles had been filled properly, checked to see that there was information for each person listed, and so forth. For type 1 DO's, questionnaires were microfilmed and edited by computer in the PO, which identified edit failures and signalled the need for clerical review or followup. Bureau programmers designed the computer edit to imitate the clerical edit performed in type 2 and 3 DO's as closely as possible. (See ch. 6 for a description of the clerical edit.)

Questionnaires failed edit if, for example, they contained answers only to the housing questions, the

<sup>16</sup>In addition, the Congress also made available for decennial census operations \$70 million that had been set aside for unemployment claims. For more information, see chapter 12 (forthcoming).

number of people for whom there were responses did not match the entered count, or if that count left the question of whether there were more than the seven people listed in the roster living in the unit. These were "coverage problems," and were marked "TW" for telephone followup. Likewise, questionnaires failed edit if the respondent had failed to answer two or more of the housing questions, two or more items for any person, any one item for every person, or (on the long form) omitted four or more of the sample housing questions and/or six or more sample population questions for any one person. These were "content problems"; clerks marked them "T" and the telephone unit sampled these at a 1-in-10 rate for actual calling. The rest were shipped to—or kept at—the processing offices without followup. When respondents could not be reached by telephone, especially when coverage was in question, the cases were referred to the DO's for enumerator visits.

**Nonresponse followup (NRFU)**—This was the largest data-collection activity during the 1990 census, and involved all stateside DO's except the two that had nothing but list/enumerate (L/E) assignments. The NRFU universe consisted of housing units for which mail-return questionnaires had not been checked in by April 22. The schedule called for enumerators to begin visiting these units on April 26 (for type 1 DO's, which received check-in information from the PO's) or May 3 (for the rest) and finish collecting completed forms for either vacant or occupied units by June 6. As of June 4, only 70 percent of the NRFU workload had been finished, and the last 2 percent remained until the end of July. Approximately 200,000 temporary employees worked on NRFU, which enumerated more than 34 million housing units. At about 3 percent of the occupied units, the enumerators ended up with just "last resort" information—at least three out of four population items (relationship, sex, race, and marital status) and two housing items (building description and tenure (owned or rented))—if repeated telephone and personal-visit contacts were unsuccessful. At vacant units, "last resort" information could be limited to the building description (question H2). NRFU work was subjected to quality-assurance checks for completeness, and these included choosing an "administrative sample" of about 350,000 cases to be reinterviewed, mainly to check for possible data falsification. Approximately 2,600 such cases were found.

### Data Collection in List/Enumerate (L/E) Areas

The 1990 census enumerated approximately 5.7 million housing units by using the L/E method (formerly called "conventional" or door-to-door canvassing), mainly in remote or sparsely settled parts of the country, or where there was a large amount of "seasonal" housing. On March 23, the Postal Service delivered unaddressed short-form household questionnaires, which the occupants were to complete and hold for an enumerator's

visit as early as March 26. As they visited each unit, the enumerators listed the units in their address registers, spotted them on their maps, collected the short forms or asked the questions shown on them, and obtained answers to sample questions from the residents of those housing units designated in the register. (Depending on the design, the sample rate was either 1 in 2 or 1 in 6.) For 1990, the enumerators used special "enumerator-friendly questionnaires" (EFQ's) that were worded suitably for reading aloud. The crew leaders reviewed the work turned in by the enumerators for completeness. The DO's arranged sample reinterviews (as in the mail census) to assure accuracy and to check for potential enumerator bias (the "sample tolerance check"). Although only 53 percent of the L/E work was finished by May 11, the scheduled end date, the 70 DO's involved were able to report success by mid-June, so completing the operation later than expected caused no significant delay.

### Field Followup

To improve data quality and coverage as much as possible, all types of offices had "field followup" of questionnaires with inconsistencies or still-missing data: Field followup enumerators verified the status of units reported as vacant or deleted (the "vacant/delete check"), followed up on questionnaires accounted for but missing or misplaced, checked addresses on the ACF for which no questionnaire had been checked in, revisited units with coverage/content edit failures, and in L/E areas, obtained long-form interviews where the L/E enumeration had failed the sample tolerance check. Field followup, timed to follow immediately after nonresponse followup, generally went well. By August 1, there was a 6.4-percent change from deleted units to occupied (compared with 7.5 percent in 1980) and an 8.7-percent change from vacant to occupied (10.1 percent in 1980). This meant that the 1990 vacant/delete check added approximately 1.5 million people to the census.

### Specialized Enumeration Procedures

The 1990 census, as had its recent decennial predecessors, required a number of specialized procedures to accommodate populations and situations outside those for which the mailed or personally collected household questionnaire were sufficient. These are briefly described in the sections below.

**Alaska remote areas**—In parts of Alaska, settlements were accessible only by air, dogsled, snowmobile, or the like, and enumeration had to be timed to coincide with the best travel conditions. Here, canvassing began in mid-February, but with all the census questions asked in relation to Census Day (April 1). Each Alaska Native village had a resident assigned as its liaison to work with the census team. When the field work was finished in mid-May, the operation had counted approximately 83,000 people in about 30,000 housing units.



**Urban areas**—In selected type 1 DO areas, the census used a technique called “urban update/leave” (UU/L) for public-housing developments and their immediate vicinities, and in some type 1 and type 2 cities in the New York and Detroit regions, “urban update/enumerate” (UU/E) for whole census blocks that consisted almost entirely of boarded-up buildings. In UU/L, there were special promotional activities before the enumeration, which was carried out by census takers who lived in the targeted developments. UU/L accounted for some 48,000 housing units; Philadelphia had the largest number of these, with Chicago second. UU/E, using regular enumerators, bypassed telephone and standard nonresponse followup as well as the vacant/delete check; it covered approximately 96 blocks in Detroit and New York City.

**Special places**—As noted earlier, there were a variety of procedures tailored to counting people who did not live in households, but rather were in institutions, living in group quarters, were transient, aboard ships or in the military, had no usual residence, and so forth. The census district offices had sections staffed to work with registers of facilities gleaned from address tapes, prelisting operations, directories, and the like. The general procedure was to contact each facility and have each person enumerated on an individual census report (ICR) that contained population questions only. There were both short- and long-form ICR's; the latter contained the sample questions. Special places (with the exception of bona fide housing units within them) were not included in the housing inventory.

**Group quarters**—The group quarters (GQ) enumeration—which ranged from boarding or rooming houses with nine or more occupants unrelated to the householder to college dormitories and large institutions—covered approximately 142,000 GQ's and 6.6 million people. In most places, the enumerators delivered and collected the ICR's, but in some GQ's, notably hospitals and prisons, the staff members completed and/or collected the forms. Most military bases carried out the census with military census reports (MCR's), which were similar to the ICR's, for personnel living in barracks, and household questionnaires for families in base housing. The returns, for some 900 bases and about 2 million people, went to the DO in which the base was located. For military ships, the Bureau provided shipboard census reports (SCR's) which appointed officers distributed, collected, and sent to the Bureau's Baltimore PO; this accounted for about 825 vessels and 270,000 personnel. There also were SCR's for Maritime Administration (MARAD) ships that carried crews and/or passengers who had the option of claiming that they had usual homes elsewhere (and would be enumerated there). The MARAD workload was approximately 850 ships and 25,000 people.

**Transient night (T-night)**—This operation took place on Saturday afternoon and evening, March 31, 1990,

when enumerators visited and interviewed at hostels, campgrounds, and the like, but not at motels and hotels. Transients could report a usual residence elsewhere. The enumerators, using ICR's, went to approximately 13,000 T-night sites nationwide.

**Shelter and street night (S-night)**—This operation was designed to count people at public and private shelters (including those for abused women) and places of commerce (such as bus and train stations), and people visible on the streets during early morning hours. In September 1989, the Bureau asked all 39,000 functioning local GU's to list these locations/facilities, and followed up on any GU with a population greater than 50,000 that did not respond. Based on what the local governments reported, the census DO's contacted the shelters and hotels and motels that either were low-cost or had subsidized units and arranged to enumerate everyone there in phase 1 of S-night—March 20, from 6:00 p.m. to midnight. During phase 2, from 2:00 a.m. to 4:00 a.m., on March 21, teams of enumerators focused on various assigned locations on the streets, in parks, under overpasses, and so forth. People leaving abandoned buildings were enumerated from 4:00 a.m. till 8:00 a.m. on March 21. Phase 2 received substantial media attention. S-night yielded a count of approximately 190,000 people in shelters and another 50,000 or so at various street locations.

**Overseas Federal civilian and military employees**—Until late July 1989, the Bureau did not intend to include overseas personnel or their dependents in the 1990 census, as they were not living in the United States. Congressional pressure to have them counted for apportionment purposes, by home State, led Commerce Secretary Mosbacher, in August 1989, to interpret census residence rules to include Federal military and civilian employees stationed overseas (and their dependents) in the apportionment population. The Department of Defense originally planned to enumerate its overseas personnel and their dependents concurrently with the stateside census, but later decided to provide the Census Bureau with data from its administrative records rather than conduct a canvass. The Bureau accepted these data and allocated them to the various States (for congressional reapportionment at the State level only—not to a particular address) based on the “home of record” reported. Throughout the Government, there were 922,819 people in this group. This action led to a suit by the State of Massachusetts contesting the Bureau's method of allocating by “home of record” instead of “home State” (i.e., where the person resided when last in the United States). The Supreme Court decided unanimously in 1992 that the Bureau had acted properly. (See ch. 12.)

### Coverage Improvement

The census procedures summarized above all had elements designed to ensure that every person and

housing unit was enumerated. Nevertheless, there still were potential situations among certain demographic groups and in certain parts of the country where extra effort would be necessary. The Bureau tried to meet this need in 1990 through a number of specialized operations that, in total, added about 5.4 million<sup>17</sup> persons to the census count. Several of these were as follows:

The "Were You Counted?" (WYC) campaign involved having newspapers and periodicals across the country print a questionnaire in English and/or any of seven other languages during June or July 1990. There were reproducible copies in 25 additional languages where needed, and the electronic media publicized the campaign as well with telephone numbers to call for assistance. Any person who thought he or she might have been missed in the census could mail in a WYC form. On receipt, DO clerks geocoded the forms for matching to the census records already accumulated after NRFU. The Bureau had to guard against duplication, misuse, and large-scale misreporting of erroneous information, particularly where communities mounted their own "sweeps." From the approximately 353,000 WYC forms received by the end of November 1990, about 260,000 persons were added to the census.<sup>18</sup>

The recanvass operation took place between mid-July and mid-October 1990 in areas where count review and other research indicated deficient housing counts. Field staff visited the areas in question to look for missed housing units, and enumerators followed up to determine whether the unit existed as of Census Day and, if so, interviewed the occupants. Recanvass ultimately involved visiting over 500,000 census blocks containing about 15 million housing units; it added around 139,000 housing units containing an estimated 178,000 people to the census.

The parolee/probationer program was new for 1990; its goal was to make certain that individuals on parole or probation in each State as of Census Day were enumerated—approximately 2.5 million people nationwide. The program started by having parole/probation officers distribute special census forms to those they supervised. In some States and counties, the Bureau obtained administrative lists with names, addresses, and characteristics such as sex and race, and collected

enough additional information for a match against census records by the end of November 1990. The processing offices handled more than 1.4 million parolee/probationer forms and added about 448,000 people to the 1990 census.

Re-enumeration occurred in one form or another in 24 DO's that had reported unusually large numbers of one-person households, as there had been allegations in the late summer of 1990 that enumerators had been fabricating data at the end of nonresponse followup. This led to the re-enumeration of approximately 129,000 households; there were response differences found in nearly 57,000 of them, resulting in adding a like number of people to the census. Seven DO's in northern New Jersey had particular problems in this respect, and investigation led to re-enumeration of 18,300 households there.

### **Puerto Rico and the Outlying Areas**

The Bureau had special agreements for taking the census with the governments of the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, and the Republic of Palau, and with the Governors of the U.S. Virgin Islands, Guam, and American Samoa. The census also covered a few "other possessions and areas over which the United States exercise jurisdiction, control, or sovereignty" (Title 13, Subchapter V, Section 191), such as Johnston Atoll and the Midway Islands in the Pacific. For Puerto Rico, the Bureau established an area office in San Juan and nine DO's in various parts of the island, reporting to the RCC in New York; the other entities had DO's under headquarters' customary oversight. In general, all these censuses were carried out using the list/enumerate method. The Puerto Rico census most closely resembled the state-side one, both in format and content, although neither the short- nor long-form questionnaire (available in both English and Spanish) had an inquiry about race. The Puerto Rico household questionnaires were FOSDIC-readable, with certain coding automated, as in the States. The household questionnaires for the Virgin Islands and the Pacific island territories asked all questions of each respondent and involved no sample forms. The Virgin Islands form included a question on race and Hispanic origin, while the others asked about race or ethnicity. The enumerations in all these areas also used the various individual, military, and shipboard report forms, as needed.

### **Closing the District Offices and Regional Census Centers**

By having the PO's handle the census returns directly for type 1 DO's and receive the ones from all other DO's on a flow basis (rather than waiting until the DO's closed one by one), the Bureau hoped the 1990 DO's generally could close earlier than they had in 1980 and that leases

<sup>17</sup>Barbara Everitt Bryant, "Components of the Resident Population," testimony prepared for delivery by the Director of the Bureau of the Census to the Subcommittee on Census and Population, Committee on Post Office and Civil Service, U.S. House of Representatives, February 21, 1991. This estimate was derived from reported census figures and from samples and, as a result, some of its components have sampling errors associated with them. While sampling errors are not reported in this chapter, they are discussed in 1990 Census of Population and Housing, *Evaluation and Research Reports*, series 1990 CPH-E.

<sup>18</sup>This estimate was derived from a sample and, as a result, has sampling error associated with it. While sampling errors are not reported in this chapter, they are discussed in 1990 Census of Population and Housing, *Evaluation and Research Reports*, series 1990 CPH-E.

would not have to be extended past August 15, 1990. While a few of the 1980 offices succeeded in finishing by late July of their year (Idaho Falls, ID, and Hartford, CT, on July 25), the earliest closing in 1990 was in West Allis, WI, on August 15. Eleven other 1990 DO's—mainly in the Midwest—closed by the end of that month. In 1980, the last DO to close was North Central Brooklyn, NY, on December 17 (because of a fire); in 1990, Detroit (MI) West remained open until December 7 to complete a special WYC campaign (see above). Otherwise, with some shifting of postcensus workloads and other operational efficiencies, most 1990 DO's closed in October or November. Closing, of course, included disposing of furniture and equipment or shipping it elsewhere, and having vendors deinstall computer systems. There were no strikes or natural disasters (such as fires or floods) to hamper any of these office operations.

The first of the 13 RCC's to close was San Francisco, on December 31, 1990, followed by New York on March 31, 1991. Philadelphia did not finish until January 1992, and four other RCC's operated until late February 1992 because their respective regional offices (to which they needed to transfer materials) were being renovated.

## DATA PROCESSING

### Introduction

A major strategy for the 1990 census was to use concurrent, or "flow," processing—the conversion (or "capture") of the information on the completed census forms, as they came in, into machine-readable data that could be edited and corrected concurrently with ongoing field operations. (For the 1980 census, data capture did not occur until each DO closed and shipped its questionnaires to the (then three) PO's. This was principally because DO-based automation was not yet feasible.) For 1990, concurrent processing could be done in strategically located centers around the country under secure conditions, and the DO's could concentrate on data collection. Security was a major concern because of the risks of (1) having the original questionnaires destroyed, (2) violating the confidentiality of the information they contained, and (3) possible fire or water damage to automated data processing, microfilming, and reading equipment. Further, to avoid potential staffing conflicts and workflow difficulties in hard-to-enumerate inner-city areas, respondents there would be asked to mail their questionnaires directly to a PO instead of to their local DO. The PO then would check in these questionnaires against the ACF; edit them by computer; telephone the respondents, if possible, to solve content or coverage problems; and refer remaining issues to the DO's for personal visits. By monitoring receipts recorded in the ACF, the PO also would advise the type 1 DO's, by computer, about which addresses were not accounted for, so that the DO's nonresponse followup enumerators could promptly visit them.

**The minicomputer contract**—All the above required an extensive automated data-processing (ADP) system. In early 1986, the Bureau decided to procure an estimated 555 minicomputers through an "indefinite-quantity" type contract for a minimum of \$6.9 million and a maximum of \$80 million for 6 years (1986-1992). These would be used for checking in questionnaires, keying certain item and address data, and preparing maps. Actual procurement was delayed until May 1987 while 1990 census plans and their attendant ADP requirements were finalized, vendor proposals were evaluated, and a contract negotiated. The final award led to two bid protests, one of which the Commerce Department settled with a \$1.1-million payment in June 1987. (See ch. 2.) The major effect of these delays was postponed development and testing of 1990 census software, a slow start in prelisting, and lack of a complete system until the latter part of the 1988 dress rehearsal. The system's use, however, revealed some functional problems that led the Bureau to procure later-model minicomputers with more memory and speed than those originally contracted for, and to do so by purchasing 105 minicomputers and leasing 362 more with an option to buy. These units would not be needed after the 1990 census data-collection effort, and, given the rapidity of technological change, their future value as used equipment was not known. This new arrangement cost \$22,790,000, as against the \$22,625,100 originally contemplated.

### Processing Offices

There were seven PO's—in Albany, NY; Austin, TX; Baltimore, MD; Jacksonville, FL; Jeffersonville, IN; Kansas City, MO; and San Diego, CA—under the control of the Decennial Operations Division's (DOD's) control. Two of them—Kansas City and Baltimore—opened in January and February 1988, respectively, Kansas City to handle materials from the dress rehearsal (see p. 14), and Baltimore for prelist address keying.<sup>19</sup> The rest followed between January 1989 and October 1989. Each PO had about 125,000 square feet of floor space plus a warehouse with close to 100,000 square feet. Each PO employed between 1,400 and 1,500 persons, who engaged in tasks ranging from administration through microfilming, keying, and other computer operations, as well as the training required for each function.

The PO's were responsible for the pretabulation processing of the 1990 census questionnaires—those checked in directly from respondents (in the case of type 1 DO's) or that arrived from the other types of DO's with

<sup>19</sup>The Baltimore PO also contained the Bureau's contractor-operated "beta test center" (BTC), in which staff could test software, prior to release, on computer systems that were nearly identical to the operating-unit systems in the field. The BTC had within it a "national support center" (NSC), in which Bureau staff coordinated the release and subsequent installation of all application software in the various 1990 census offices. The NSC had an electronic mail system to deal with referred problems.

check-in, clerical edit, and telephone and personal-visit followup already accomplished. Once to this point, the PO's Film and Automated Camera Technology 1990 (FACT 90) operations photographed the questionnaires onto 16 mm microfilm, developed the film, scanned the film with FOSDIC<sup>20</sup> machines at a rate of approximately 40,000 pages a minute, and "captured" the data (i.e., converted them to machine-readable form) into computer files. Each PO had between 8 and 12 high-speed cameras, 2 or 3 processors for developing the film, and 3 FOSDIC machines. The PO's used a menu-driven data-base control and tracking system (CATS) to monitor the questionnaires and other materials during processing, which then continued through such steps as the following:

- Search/match, where respondents enumerated at one location reported a permanent residence somewhere else.
- Computer editing for content (missing or multiple answers) and coverage (missed people).
- "Split" operations, which put the edited questionnaires on various tracks, depending on whether they had been accepted, needed followup or repair, etc.
- Telephone followup with respondents (between April and September).
- Telephone assistance, with approximately 2.5 million calls; 41 percent of the callers reported that they had not received a census form. All seven PO's provided assistance in English and Spanish; the San Diego PO handled calls in six Asian languages as well.
- Data keying of names, written-in sample responses and race entries, and all data collected in the post-enumeration survey (PES; see p. 38), using microfilm access device (MAD) equipment. The MAD displayed the entry for the keyer as it appeared on the microfilm; using appropriate programs, the keyer entered the names or codes directly to the computer record for the household. Some of the coding was assigned to PO's that had specialized units; Jeffersonville and Charlotte handled place of birth, migration, and place of work, while Kansas City did occupation and industry.
- Transmitting the data, processed to this point, to Bureau headquarters and, upon acceptance, disposing of the paper records and other confidential materials either received or produced in the PO's. Disposition for 1990, under conditions that preserved confidentiality, involved some 6,000 tons of paper that contractors recycled by any means that totally obliterated printing and handwritten entries.

<sup>20</sup>Film optical sensing device for input to computers (see p. 7). In 1980 and earlier censuses, clerks had to code written-in information by filling in FOSDIC circles, but for 1990, they keyed the codes directly onto the tape record.

Most of the PO's closed between June and September 1991; the Jeffersonville PO remained open until March 1992.

## Headquarters Processing

In 1982, planning began for the 1990 census tabulation and publication system, which, for the standard products alone, would be required to: Tabulate 12 billion cells of data and create 500,000 publication-quality pages, place 85 billion cells of data on 1,600 original public-use tapes for nearly 8 million geographic entities, and produce 40 million frames of data on 200,000 original microfiche. (The issue of CD-ROM had not arisen yet.) The large-file processing (tabulation) would be done on the Bureau's UNISYS mainframe computers or on a "family" of mini- and micro-computers working together, while a microcomputer network would deal with specifications and related processes.

The Bureau had four UNISYS 1100-series mainframe computer systems in place: an 1100/74 machine for the economic and agriculture censuses, two 1100/84 machines for the decennial census and various surveys, and a third 1100/84 machine for the TIGER System. There were more than 700 communications devices connected to the four mainframes; these included interactive terminals, minicomputers, remote batch input devices, remote printers (impact and laser), and a remote XYVISION photocomposition system. Early on, the staff used an IBM 3800 page printer system, but replaced that with two Xerox 9790 systems and made arrangements for a third for backup purposes. These accommodated a Bureauwide workload of almost 2 million pages a month, with peaks of 600,000 pages in 12 hours.<sup>21</sup>

The most important components for the 1990 census were as follows:

The **data-product specification system** (DPSS) designed for 1990 consisted of a series of interrelated data bases that were cumulative and reusable, a sharp contrast with the 1980 labor-intensive process. The DPSS, tested on tape products in the fall of 1989 and for the printed reports in the winter of 1989-90, generated unique cells of statistical data as well as the base-table images and tables.

The **tabulation system** was an automated general-purpose software system that interacted with the DPSS to determine, for entire product lines, which data to tabulate and the geographic levels for which they should be summarized. This system also provided standardized software for preparing public-use ("user") tapes.

The **printed report system** had several components. In the summer of 1988, the staff decided against using the 1980 decennial composition system (DCS) for the 1990 publications, but chose instead to adopt the computerized table image processing system (TIPS) II,

<sup>21</sup>Bureau of the Census, "Information Technology Plan, 1988."

already in place for the 1987 economic, agriculture, and governments censuses. TIPS II was a "front end" set of computer programs that merged the numerical data with the appropriate base table images, producing the formatted statistical tables for the printed reports. The census electronic publishing system (CEPS) composed text materials received in electronic form, and the electronic graphics system (EGS) prepared graphs, logos (logotypes), covers, etc.

The **TIGER System** (see pp. 15-16) was the fourth necessary component, as it was the automated source of the reference files for both collection and tabulation geography, and for the maps that accompanied or were part of the various data products.

The DOD, working with two subject-matter divisions (the Population Division and the Housing (later Housing and Household Economic Statistics) Divisions), created two edited detail files for each State and the District of Columbia, Puerto Rico, and the Virgin Islands. (The Bureau's International Statistical Programs Center processed the data from the Pacific island territories.) The 100-percent edited detail file (HEDF) contained the edited data collected from the total population and every housing unit; the sample edited detail file (SEDF) had the edited and weighted data collected from the sample households and GQ populations. These operations consisted of linking the various files received from the processing offices to determine the final status and population count for each housing unit and GQ, reviewing such items as race and age, making repairs, ensuring the geographic codes were correct, and applying disclosure-avoidance procedures (see below). In the case of the SEDF, the sample estimates also had to be weighted to agree with the characteristics from groups of records in the HEDF. When discrepancies became apparent through processing large quantities of data, the staff corrected and recycled the files through the various computer steps. HEDF processing began in November 1990, and SEDF processing, in June 1991.

**Disclosure avoidance**—User comments led to a change in the way the Bureau handled the issue of disclosure avoidance in the 1990 publications. For 1980, the staff had used a technique called "suppression," in which data—beyond simple population and housing counts—were not published for any area that did not contain a minimum number of responses, because doing so might disclose the identity of a particular individual or household. There also was "complementary suppression," to prevent deriving suppressed primary values by subtracting unsuppressed values from totals. After considering such alternatives as perturbation (random or controlled, to a subset of the data) and rounding (treated similarly), the Bureau turned in 1987 to a method of matching and data interchange, in which households in the HEDF would be sampled, their records matched, and their data interchanged with those in different geographic areas. In

1989, Bureau staff decided to use a second method as well; this was called "blanking and imputation." It blanked selected sample data items on a subset of individual household and person records and imputed responses for these items as if there had been no answers in the first place. The Bureau adopted both procedures and called them the "confidentiality edit."

## PRODUCT PROCESSING AND DISSEMINATION

Once the HEDF and/or SEDF had been accepted as final for a State (or statistically equivalent entity), its processing began for the various product lines.

### Public-Use Tapes

For the summary tape files (STF's) and public-use microdata sample (PUMS) files, the mainframe computers at headquarters produced master and backup "sales" tapes. The DUSD copied the latter for distribution to State data centers, census information centers, and the like, or to fill customers' orders, and also used them (through a microcomputer local-area network) to produce the technical documentation needed to accompany the tapes. Virtually all 1990 census public-use tapes were produced on 6,250-bpi reels (or IBM 3480-compatible cartridges) for mainframe computers in either EBCDIC<sup>22</sup> or ASCII<sup>23</sup> format, although 1,600-bpi reels were also still available. Tapes/cartridges were priced either per reel or by the number of megabytes (mb) of data on them (with a minimum price for one reel). The STF's did not contain maps, but with the appropriate software and TIGER/Line<sup>®</sup> or other compatible geographic files, they could be used in data-mapping applications. The DUSD issued STF's from the 1988 dress rehearsal so that users could practice working with 1990 tapes.

The first 1990 tapes began appearing in January 1991 (with Public Law (P.L.) 94-171 tabulations for the States; see "1990 Census Redistricting Program") and continued through 1994. As for the 1980 census, STF's 1 and 2 included the population and housing subject items collected on a 100-percent basis. STF's 3 and 4 contained subject items collected on a sample basis and generally included cross-classifications with 100-percent items. The 1990 STF 4A and 4B were almost a third larger than their counterparts in 1980; to avoid further expansion, the Bureau put place-of-work data in a separate file, STF 420. (STF 5, a massive 1980 census file containing over 100,000 cells of population and housing data, was dropped for lack of demand.)

<sup>22</sup>Extended Binary Coded Decimal Interchange Code, a character set designed originally for use with IBM (International Business Machines) computers.

<sup>23</sup>American Standard Code for Information Exchange, a code used in computers and communications systems in which each character, number, or special character was defined in eight bits.



As before, the STF's were divided into files labeled "A," "B," "C," and "D," which indicated different geographic structures. STF 1A, for example, went down to the level of block groups, while the larger STF 1B encompassed individual census blocks. The "C" files were usually U.S. summaries, and the "D" files dealt with congressional districts.

The Bureau also released the following special product files:

- **Subject summary tape files** (SSTF's) corresponded with, and contained more geographic detail than, the printed subject reports.
- The **Public-Use Microdata Sample** (PUMS) files for 1990 were 5- and 1-percent samples similar to those for 1980, with the addition of a 3-percent sample that concentrated on the elderly population.
- **MARS** (modified age, race, and sex) files were created for users wanting race and age data by single years, tabulated by sex and Hispanic origin for several levels of geography.
- **1990 Census/EEO** (equal employment opportunity) files offered data on 512 occupations and on educational attainment, cross-tabulated by sex, race, and Hispanic origin.
- The **Census Transportation Planning Package** (CTPP), for State departments of transportation, continued the 1970 and 1980 Urban Transportation Planning Package programs.

For 1990, the Bureau also offered a User-Defined Areas Program (UDAP), in which users could specify their own geographic areas for tabulation purposes and receive a standard package of tables, maps, and text. Where the UDAP was insufficient, users could order special tabulations, as in the past.

## CD-ROM

CD-ROM was the acronym for "compact disc, read-only memory," an electronic medium capable of being used with a microcomputer. In 1986, the Census Bureau became the first Federal agency to create and distribute its own statistics on CD-ROM. The discs issued for the 1990 census were 4-3/4 inches in diameter and could hold 650 mb of data, generally from the public-use tapes. The DUSD contracted with a private vendor to manufacture discs for virtually all STF's and PUMS files, as well as many of the TIGER/Line<sup>®</sup> files (see section on geographic products). These constituted well over 90 percent of the nearly 4,700 CD's sold in fiscal year 1993 alone. (The Bureau also released CD-ROM's for the economic, agriculture, and governments censuses.)

## Printed Reports and Microfiche

The DOD and the Administrative and Publications Services Division (APSD) used the Bureau's mainframe computers, a local-area network (LAN) of microcomputers, and the public-use tape systems (see above) at the

geographic levels specified, for the various printed reports, along with text, charts, historical statistics, illustrations and maps, etc. The subject-matter divisions reviewed and cleared the materials at various steps in this process, the end products of which were digital files that were sent electronically to the Government Printing Office (GPO) to be processed by its VideoComp system; the GPO returned photographic negatives to the Bureau for review. The GPO made multiple awards to contractors (five contractors in FY 1992 and six in FY 1993) for printed reports, with quantities ranging from 1,300 to 5,000 copies each. The GPO also supplied copies of each report to Federal depository libraries and to the Superintendent of Documents for sale. For 1990, the GPO issued most stock numbers and prices in advance of publication, a change from 1980, when it tended not to price reports until it knew the actual cost from the contractors' bid prices.

For 1980, the Bureau had produced a considerable amount of census data on microfiche (4"x 6" sheets of film containing images of up to 98 pages of printed or graphic material, easily read on inexpensive equipment and capable of being enlarged and copied onto paper as needed). During the decade that followed, microcomputers—with access to a variety of data bases—became commonplace in the user community, so for 1990, the Bureau generally limited fiche to copies of printed reports. For these fiche, the DUSD reformatted the publication tapes into so-called "line printer files" that the Department of Commerce's Office of Publications used to produce the fiche copies. The DUSD sold the fiche at a price based on the number ordered.

The printed publications appeared, in three series of final reports—1990 CP (for census of population data), 1990 CH (for census of housing data), and 1990 CPH (for population and housing data combined), beginning with the 100-percent tabulations alone and progressing through the sample estimates as those became available. There were no preliminary or advance reports, as there had been in the past. Furthermore, much of the data previously released in reports such as the 1980 Detailed Population Statistics or Metropolitan Housing Statistics was shifted for 1990 to subject reports and their associated computer files. Most series reports grouped together all tables for a specific race or for Hispanics, enabling users to locate all the information for each group in one place. Another change involved splitting off into separate reports tabulations for geographic areas that crossed State lines—a condition that had delayed publication for some States in 1980.

Figure 5 summarizes the basic printed report series containing data from the 1990 census.<sup>24</sup> There also were some specialized series: 1990 CP-S and CH-S supplementary reports, the latter called "1990 Housing

<sup>24</sup>For detail, see Chapter 10, "Data Products and Dissemination." (forthcoming); for 1980, see 1980 Census of Population and Housing, *History*, Part D, PHC80-R-2D (1989), ch. 8.

Figure 5. 1990 Census Printed Reports

Series	Title	Report(s) issued for	Description	Geographic areas
<b>1990 CENSUS OF POPULATION AND HOUSING (1990 CPH)</b>				
<b>100-Percent Data</b>				
1990 CPH-1	<b>Summary Population and Housing Characteristics</b>	U.S., States, DC, Puerto Rico, and U.S. Virgin Islands	Population and housing unit counts, and summary statistics on age, sex, race, Hispanic origin, household relationship, units in structure, value and rent, number of rooms, tenure, and vacancy characteristics	Local governmental units (i.e., counties, places, and towns and townships), other county subdivisions, and American Indian and Alaska Native areas
1990 CPH-2	<b>Population and Housing Unit Counts</b>	U.S., States, DC, Puerto Rico, and U.S. Virgin Islands	Total population and housing unit counts for 1990 and previous censuses	States, counties, county subdivisions, places, State component parts of metropolitan areas (MA's) and urbanized areas (UA's), and summary geographic areas (for example, urban and rural)
<b>100-Percent and Sample Data</b>				
1990 CPH-3	<b>Population and Housing Characteristics for Census Tracts and Block Numbering Areas</b>	MA's, and the nonmetropolitan balance of each State, Puerto Rico, and U.S. Virgin Islands	Statistics on 100-percent and sample population and housing subjects	In MA's: census tracts/block numbering areas (BNA's), places of 10,000 or more inhabitants, and counties. In the remainder of each State: census tracts/BNA's, places of 10,000 or more, and counties
1990 CPH-4	<b>Population and Housing Characteristics for Congressional Districts of the 103rd Congress</b>	States and DC	Statistics on 100-percent and sample population and housing subjects	Congressional districts (CD's) and, within CD's, counties, places of 10,000 or more inhabitants, county subdivisions of 10,000 or more inhabitants in selected States, and American Indian and Alaska Native areas
<b>Sample Data</b>				
1990 CPH-5	<b>Summary Social, Economic, and Housing Characteristics</b>	U.S., States, DC, Puerto Rico, and U.S. Virgin Islands	Statistics generally on sample population and housing subjects	Local governmental units (i.e., counties, places, and towns and townships), other county subdivisions, and American Indian and Alaska Native areas
<b>1990 CENSUS OF POPULATION (1990 CP)</b>				
<b>100-Percent Data</b>				
1990 CP-1	<b>General Population Characteristics</b>	U.S., States, DC, Puerto Rico, and U.S. Virgin Islands	Detailed statistics on age, sex, race, Hispanic origin, marital status, and household relationship characteristics	States, counties, places of 1,000 or more inhabitants, county subdivisions of 1,000 or more inhabitants in selected States, State parts of American Indian areas, Alaska Native areas, and summary geographic areas such as urban and rural

Figure 5. 1990 Census Printed Reports—Con.

Series	Title	Report(s) issued for	Description	Geographic areas
<b>1990 CENSUS OF POPULATION (1990 CP)—Con.</b>				
<b>100-Percent Data—Con.</b>				
1990 CP-1-1A	<b>General Population Characteristics for American Indian and Alaska Native Areas</b>	U.S.	Detailed statistics on age, sex, race, Hispanic origin, marital status, and household relationship characteristics	American Indian and Alaska Native areas; i.e., American Indian reservations, off-reservation trust lands, tribal jurisdiction statistical areas (Oklahoma), tribal designated statistical areas, Alaska Native village statistical areas, and Alaska Native Regional Corporations
1990 CP-1-1B	<b>General Population Characteristics for Metropolitan Areas</b>	U.S.	Detailed statistics on age, sex, race, Hispanic origin, marital status, and household relationship characteristics	Individual MA's. For MA's split by State boundaries, summaries are provided both for the parts and for the whole MA
1990 CP-1-1C	<b>General Population Characteristics for Urbanized Areas</b>	U.S.	Detailed statistics on age, sex, race, Hispanic origin, marital status, and household relationship characteristics	Individual UA's. For UA's split by State boundaries, summaries are provided both for the parts and for the whole UA
<b>Sample Data</b>				
1990 CP-2	<b>Social and Economic Characteristics</b>	U.S., States, DC, Puerto Rico, and U.S. Virgin Islands	Statistics generally on sample population subjects	States (including summaries such as urban and rural), counties, places of 2,500 or more inhabitants, county subdivisions of 2,500 or more inhabitants in selected States, Alaska Native areas, and the State portion of American Indian areas
1990 CP-2-1A	<b>Social and Economic Characteristics for American Indian and Alaska Native Areas</b>	U.S.	Statistics generally on sample population subjects	American Indian and Alaska Native areas, as for CP-1-1A
1990 CP-2-1B	<b>Social and Economic Characteristics for Metropolitan Areas</b>	U.S.	Statistics generally on sample population subjects	Individual MA's, as for CP-1-1B
1990 CP-2-1C	<b>Social and Economic Characteristics for Urbanized Areas</b>	U.S.	Statistics generally on sample population subjects	Individual UA's, as for CP-1-1C
1990 CP-3	<b>Population Subject Reports</b>	U.S.	Reports on selected population census subjects	Generally limited to the U.S., regions, and divisions; for some reports, other highly populated areas such as States, MA's, counties, and large places



Figure 5. 1990 Census Printed Reports—Con.

Series	Title	Report(s) issued for	Description	Geographic areas
<b>1990 CENSUS OF HOUSING (1990 CH)</b>				
<b>100-Percent Data</b>				
1990 CH-1	<b>General Housing Characteristics</b>	U.S., States, DC, Puerto Rico, and U.S. Virgin Islands	Detailed statistics on units in structure, value and rent, number of rooms, tenure, and vacancy characteristics	States, counties, places of 1,000 or more inhabitants, county subdivisions of 1,000 or more inhabitants in selected States, State parts of American Indian areas, Alaska Native areas, and summary geographic areas such as urban and rural
1990 CH-1-1A	<b>General Housing Characteristics for American Indian and Alaska Native Areas</b>	U.S.	Detailed statistics on units in structure, value and rent, number of rooms, tenure, and vacancy characteristics	American Indian and Alaska Native areas; i.e., American Indian reservations, trust lands, tribal jurisdiction statistical areas (Oklahoma), tribal designated statistical areas, Alaska Native village statistical areas, and Alaska Native Regional Corporations
1990 CH-1-1B	<b>General Housing Characteristics for Metropolitan Areas</b>	U.S.	Detailed statistics on units in structure, value and rent, number of rooms, tenure, and vacancy characteristics	Individual MA's. For MA's split by State boundaries, summaries are provided both for the parts and for the whole MA
1990 CH-1-1C	<b>General Housing Characteristics for Urbanized Areas</b>	U.S.	Detailed statistics on units in structure, value and rent, number of rooms, tenure, and vacancy characteristics	Individual UA's. For UA's split by State boundaries, summaries are provided both for the parts and for the whole UA
<b>Sample Data</b>				
1990 CH-2	<b>Detailed Housing Characteristics</b>	U.S., States, DC, Puerto Rico, and U.S. Virgin Islands	Statistics generally on sample housing subjects	States (including summaries such as urban and rural), counties, places of 2,500 or more inhabitants, county subdivisions of 2,500 or more inhabitants in selected States, Alaska Native areas, and State parts of American Indian areas
1990 CH-2-1A	<b>Detailed Housing Characteristics for American Indian and Alaska Native Areas</b>	U.S.	Statistics generally on sample housing subjects	American Indian and Alaska Native areas, as in 1990 CH-1-1A
1990 CH-2-1B	<b>Detailed Housing Characteristics for Metropolitan Areas</b>	U.S.	Statistics generally on sample housing subjects	Individual MA's, as in 1990 CH-1-1B
1990 CH-2-1C	<b>Detailed Housing Characteristics for Urbanized Areas</b>	U.S.	Statistics generally on sample housing subjects	Individual UA's, as in 1990 CH-1-1C
1990 CH-3	<b>Housing Subject Reports</b>	U.S.	Reports on selected housing census subjects	Generally limited to U.S., regions, and divisions; for some reports, other highly populated areas such as States, MA's, counties, and large places

Source: U.S. Bureau of the Census, *Census Catalog & Guide: 1995* (Washington, DC: Government Printing Office, 1995), pp. 193-95.

Highlights." New for 1990 was an extensive series, CPH-L (begun in the spring of 1991), of population and housing topical data products that users could purchase directly "on demand" from the Population Division at the cost of reproduction on paper or diskette.

## Maps

Beginning with the TIGER System (described on pp. 15-16), the Geography Division (GEO) prepared data-product maps on various hardware "platforms" mainframe, mini- and micro-computers, and workstations—along with output devices, such as electrostatic plotters in the RCC's and the DPD in Jeffersonville, IN, and the U.S. Geological Survey's high-resolution raster plotters (to produce film positives). The presentation of the individual geographic entities varied among the map types, depending on map scale and content, sheet size, and geographic coverage. There were two basic types of data-product maps:

- **Electrostatically plotted map sheets** sold separately from the public-use tapes, CD-ROM's, indexes, or the printed reports for census tracts and block-numbering areas. These were monochromatic (black and white). The principal series were as follows:

Map series	Issue dates	Number of map sheets
County Block Maps and Indexes		
P.L. 94-171 County Block Maps . . . . .	Dec. 1990-Apr. 1991	59,780
Entity-Based Block Maps . . . . .	1992-93	5,000
Census/STF County Block Maps . . . . .	Feb.-Nov. 1991	69,136
County Subdivision Outline Maps and Indexes . . . . .	Spring 1992	101
Census Tract/Block Numbering Area Outline Maps . . . . .	Feb.-Apr. 1991	5,708
Voting District Outline Maps . . . . .	Feb.-June 1991	7,819
Urbanized Area Boundary Maps . . . . .	Oct. 1991-Feb. 1992	459

The GEO also produced electrostatically plotted State and county maps, on order, showing the districts of the 103rd Congress.

- **Film negatives** were prepared for maps appearing in published reports. Some of these maps were monochromatic; others, notably the thematic ones, were multicolored. Some of the thematic maps were of the "stand-alone" type that could be sold separately. All 1990 census maps came in three standard sizes (measurements are approximate): page, 8-1/2" x 11"; two-page, 11" x 17"; and full size, up to 36" x 46."

Maps for the following geographic entities were produced:

- The United States of America
- Census Regions and Divisions of the United States
- State and County Outline Maps
- State/Metropolitan Area Outline Maps

Metropolitan Areas of the United States: 1990  
County Subdivision Outline Maps and Location Indexes

Urbanized Area Outline Maps

Urbanized Areas of the United States: 1990

American Indian and Alaska Native Areas: 1990  
Congressional District Outline Maps for the 103rd Congress

(also appeared in the Congressional District Atlas and as a separate U.S., wall-size map not in any printed report (July 1993))

The thematic maps in the published reports were—

Major Acquisitions of Territory by the United States and Dates of Admission of States

Mean Center of Population of the United States: 1790-1990

Median Center of Population of the United States: 1880-1990

Population and Geographic Centers of the United States: 1990

Other thematic maps (in color and/or patterns) had been planned for the GE-90 map series; except for one map on the Black population (No. 3, June 1992), the Bureau funded only page-size maps showing the distribution of the Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native populations, and these only for special events and education programs. The others, including the popular "night time" population distribution map, were initially canceled for budgetary reasons, then revived as part of the Bureau's intercensal education program. They were released in late 1994.

## TIGER/Line® Files and Other TIGER Extract Products

The Bureau issued a number of geographic products for the 1990 census, primarily in electronic form, as public-use extracts from its TIGER data base, but not intended to be limited to that census's applications, such as in conjunction with the STF's. In order to use the information from the TIGER/Line® files on tape and compact disc, purchasers usually had to have (or obtain elsewhere) any necessary applications software. Technical documentation was printed for each product and could be purchased separately. The appropriate documentation was supplied free with each tape order, and it appeared on each CD-ROM (from which it could be printed out). A few of the files had paper versions. Most of the TIGER products listed below were issued by State and by county within State, and priced by county plus a standard charge per State; stand-alone tapes or discs usually were priced individually.

TIGER products	Release dates
TIGER/Line® Files	
Prototype .....	Early 1989
Precensus .....	Oct. 1989-Feb. 1990
Initial Voting District (VTD) Codes .....	Oct. 1990
1990 (Postcensus) .....	Early 1991; CD-ROM, June-Sept. 1991
1992 .....	Sept. 1993
Block Equivalency and Geographic Entity files for the 103rd Congress .....	Feb. 1993
TIGER/GICS™ (Geographic Identification Code Scheme) .....	Summer 1993 (tape and one CD-ROM)
TIGER/GRF-N™ (Geographic Reference File-Names) .....	Spring 1991
TIGER/Map_Sheet Corner Point Coordinate™ file .....	July 1991
1991 Contiguous County file .....	March 1992
TIGER/Map Sheet Geography™ file (map sheet listings) .....	Late 1991
TIGER/UA Limit™ (Urbanized Areas) file ..	July 1992 (also on CD-ROM)
TIGER/Census Tract Comparability™ file ..	April 1992 (also on CD-ROM)
TIGER/Census Tract Street Index™	
Version 1 .....	Paper printout: Jan. 1992 Computer tape: April 1992 Microfiche: Jan. 1993
Version 2 .....	Paper booklets: Dec. 1994 CD-ROM: Dec. 1994- Feb. 1995

The Bureau also released a series of TIGER/Boundary files containing digital representations of the boundaries of various geographic entities (such as counties, congressional districts, and urbanized areas). A reduced set of coordinates made these files suitable for use on desk top computers.

## Dissemination

**Redistricting data**—One of the Bureau's first obligations, after reporting the official population counts for each State to the President on December 26, 1990, for the purpose of reapportioning seats in the U.S. House of Representatives (see p. 1), was to furnish a set of population tabulations to each State. In compliance with Public Law 94-171 (1975), which amended the Bureau's governing statute, Title 13, U.S. Code (specifically Section 141(c)), the States were to specify the geographic areas for which they needed data in order to determine congressional, State, and local legislative boundaries. The Bureau then would supply, no later than a year after Census Day, the necessary maps and tabulations. Beginning in 1985, the Bureau's 1990 Redistricting Data Office coordinated activities involving State officials who determined voting district boundaries and briefed other groups and organizations with stakes in the redistricting process. The population counts for 1990 included total population, the number of persons 18 years of age or older (i.e., voting age), and population distributions by race and Hispanic origin. Housing-unit counts were available by special arrangement. Between January 14 and March 8, 1991, the Bureau shipped the counts on computer tape and/or paper, together with maps, to the

designated officials (regardless of political party) in the 50 States, the District of Columbia, and Puerto Rico. In all, the deliveries covered 7 million census blocks and over 170,000 voting districts. (See ch. 10 for history and more detail.)

As in earlier decennial censuses, the Bureau's mandate was to furnish statistics to Federal and State agencies, the Congress, and the Federal depository library systems. (The Superintendent of Documents, U.S. Government Printing Office, distributed most of the printed reports in the latter category, while the DUSD was the primary dispenser of maps, microfiche, and machine-readable products.) The Bureau's International Statistical Programs Center exchanged publications with other countries.

**Marketing**—The Bureau marketed its products and expanded its customer (user) base through training, information, and publicity. There were videotapes ("The Census Comes Home," "Informing America," "Hitched to the Planet: Census Bureau Data and Geographic Inquiry"); a variety of promotional/informational brochures such as the "We" series ("We, the American Asians," etc.), "Statistical Briefs," "Product Profiles," and "Do You Know Which 1990 Report...?"; and sets of instructional slides and film transparencies, such as "Accessing Ancestry Data" and "Developing a Community Profile." Workshops (e.g., "Profiling Older Americans") and exhibits featured 1990 census products; regional office staffs were responsible for conducting more than 1,000 workshops, presentations, site visits, exhibits, and the like. Those same offices responded to more than 150,000 inquiries in 1992, most of them related to 1990 census data; the DUSD's Customer Services Branch received another 80,000 calls (mainly about products), and the Population Division's Statistical Information Office had 16,000 requests for specific figures. The Housing and Household Economic Statistics (HHES) Division handled about 15,000 calls, many related to income or similar topics. The Census Bureau/Bureau of Economic Analysis Electronic Forum's "bulletin board" averaged 6,000 connections a month, with about 75 percent of them decennial-census related. The Public Information Office provided data through press releases, responded to some 6,000 inquiries from the media in 1992, and collaborated with the DUSD and the Newspaper Association of America in several series of seminars for reporters and editors.

Secondary usage was widespread and did not lend itself to direct measurement. Examples of such usage would be the customers of vendors who purchased Bureau products and added other data and analysis, library patrons, members of university consortiums, newspaper and periodical readers, users of commercial online computer services, and customers of various data centers and their affiliates.

**Online services**—In the early 1980's, the Bureau explored the idea of disseminating statistical highlights through

national time-sharing services, and in 1984 and 1987, respectively, signed agreements to furnish data, under the trademark CENDATA, to DIALOG and CompuServe. For 1990, the DUSD extracted the appropriate tabulations from the standard public-use tapes and the vendors mounted the extract copies on their mainframe computers. Service grew from a few thousand connections in the early 1980's to an estimated 50,000 users downloading some 396,000 files onto personal computers in calendar year 1992.

In 1993, the Bureau initiated a service called FastFax, whereby "less technically inclined" data users could order press releases or printed tabulations on a variety of topics, including those about the decennial census. Customers called a "900" telephone number (that had a per-minute charge) and received the documents on their facsimile machines at no cost for the return call.

**Data centers**—The Bureau had a number of programs in which it obtained a "multiplier effect" in disseminating its statistics—particularly those from the decennial census by supplying data products, training, technical assistance, and consultation.

- The **State Data Center (SDC) Program**, already in place for the 1980 census, continued to expand during the ensuing decade, with SDC lead agencies in all States and territories.
- In 1988, the Bureau started a 1-year **Business and Industry Data Center (BIDC)** pilot program in 15 States (with the emphasis on economic development). By 1992, there were BIDC participants in 23 States. By 1992, the number of SDC/BIDC affiliates had grown to around 1,750. Over all, the program serviced more than 1,150,000 client data requests in calendar year 1992, up from more than 500,000 in 1985. Program responses ranged from data read over the telephone to elaborate special reports.
- The **National Census Information Center (NCIC) Program** began in 1988 as an outgrowth of the Bureau's National Services Program, with a pilot project focused on the data needs of national minority organizations. It started with the National Urban League's Washington, DC headquarters, which, in turn, established information centers with some of its affiliates in various parts of the country. From 1990 through 1992, the program accepted the Southwest Voter Research Institute, the Asian/Pacific Islander Data Consortium, and the Indian Net Information Center, and their respective affiliates.
- In 1992-93, the Bureau and the University of Michigan had a joint statistical agreement whereby that school's **Interuniversity Consortium for Political and Social Research (ICPSR)** received and disseminated 1990 census public-use tapes and offered training in their use among its 350 member schools. The Superintendent of Documents and the Bureau continued to

supply materials throughout the country to over 1,400 **Federal Depository Libraries**, plus about 100 smaller public facilities not in the Federal system.

- The **National Clearinghouse for Census Data Services** was a Bureau-maintained register of about 200 private, academic, and public organizations that offered data retrieval and related services to outside customers.
- The **TIGER Resource List** was a similar listing of over 100 private, academic, and public organizations that offered TIGER/Line® file processing services to outside customers. The Bureau did not regulate or endorse any of the registrants, but it offered the lists to inquirers.

## RESEARCH, EVALUATION, AND EXPERIMENTAL (REX) PROGRAM

### Introduction

The Census Bureau's REX efforts began in the 1920's, with attempts at estimating intercensal populations for small incorporated places, progressing through probability sampling and estimates for characteristics in the 1940 census, and a post-enumeration survey (PES) and other evaluations after the 1950 and subsequent censuses.

The 1990 REX program<sup>25</sup> resembled the one for 1980 both in content and scope: it was an "umbrella" for evaluations of coverage, content, and procedures. Various divisions, notably the Statistical Support Division (STSD; name changed to Decennial Statistical Studies Division (DSSD) in 1992) and the Statistical Research Division (SRD), did the evaluating under the general coordination of the Decennial Planning Division (DPLD; name changed to Decennial Management Division (DMD) in 1992). Some of the 1990 REX projects dealt specifically with the minority undercount, such as the Center for Survey Methods Research's (CSMR's) ethnographic studies, or less directly in the various coverage evaluations.

Some of the estimates in this summary of the 1990 REX program were derived from samples and, as a result, have sampling errors associated with them. While sampling errors are not reported in this chapter, they are discussed in 1990 Census of Population and Housing, *Evaluation and Research Reports*, series 1990 CPH-E.

### Coverage Evaluation and Measurement

The Bureau approached the question of 1990 census coverage through the post-enumeration survey (PES), which estimated net coverage errors from survey results on a case-by-case basis, and demographic analysis (DA), which relied on aggregated data to measure

<sup>25</sup>See chapter 11 for background.

completeness of coverage and assess the accuracy of the PES. Other studies considered the behavioral causes of undercounting, and evaluated coverage-improvement and related projects within the census itself.

**Post-enumeration survey (PES)**—The 1990 PES consisted of an independent sample of nearly 172,000 housing units<sup>26</sup> clustered in about 7,500 of the 7 million census blocks in the 50 States and the District of Columbia. There was oversampling in areas with (1) American Indian reservations and trust lands and (2) significant Black, Hispanic, or Asian populations. Puerto Rico had a separate PES. A “P” sample, consisting of all people living in the sample blocks at the time of the PES, measured the proportion of people missed by the census. An “E” sample comprised all the census enumerations coded to the sample blocks, whether or not they actually belonged there, and measured the proportion of erroneous census enumerations.

Bureau field interviewers listed the PES sample units before Census Day and RCC employees visited them beginning in June 1990 to independently interview sample cases. Clerks in the PO’s matched the PES records against those from the census. Using a statistical method called “dual-system estimation,” the PES arrived at the “true” population for each sample block and estimated the net undercounts for the Nation, for each census region and division, for each State, and for every metropolitan area in time for the Secretary to consider these when making a decision on adjusting the 1990 census in July 1991 (see p. 41-42).

The PES measured higher undercounts in the South and West and lower ones in the Northeast and Midwest. By race and Hispanic origin, the PES’s estimates of the national undercount for 1990 were as follows:

Racial/Ethnic group	Percentage undercount
Total population	1.6
Non-Black	1.2
Black	4.4
Hispanic (can be any race)	5.0
Asian/Pacific Islander	2.3
American Indian/Alaska Native	5.2

**Demographic analysis (DA)**—Bureau staff calculated their DA of census coverage by comparing the 1990 census counts with independently obtained estimates of the total resident population of the United States. They examined birth, death, and Medicare records from State and local registration systems, and official immigration data from the U.S. Immigration and Naturalization Service. Undocumented aliens continued to be one of the

most problematic DA components; residual-estimation techniques based principally on analyzing Current Population Survey (CPS) data on the foreign-born led to an estimate for 1990 of 3.3 million. The 1990 DA generated only national estimates—the total U.S. population and its sex, age, and racial composition. For purposes of comparison, DA estimated the overall national undercount for 1990 to be 1.8 percent, as compared with 1.2 percent for 1980. DA could compute differential undercount only between Blacks and non-Blacks; the percentages were as follows: 1990, 4.4 percent (5.7 percent Black and 1.3 percent non-Black), and 1980, 3.7 percent (4.5 percent Black and 0.8 percent non-Black).

**Ethnographic studies**—The Bureau’s CSMR had joint statistical agreements (JSA’s) with ethnographers, who carried out “alternative enumerations” in 29 sample areas throughout the continental United States and Puerto Rico within a few months after Census Day. They looked for causes of coverage error, notably mobility, language and literacy barriers, concealment to protect resources (e.g., illicit income) combined with disbelief in census confidentiality, irregular (i.e., not conforming to census definitions) housing and household arrangements, and resistance—passive or active—as a strategy for dealing with outsiders, especially government. All were found significant. The ethnographers stressed the need for greater use of indigenous enumerators and media, and for census definitions and training that would capture household complexities.

**Coverage improvement studies**—Nearly 30 smaller studies appraised research on enumerating people without a usual residence, considered the causes of census error and the characteristics of nonrespondents, and evaluated how well the various coverage improvement operations in the census itself had worked.<sup>27</sup>

## Content Evaluation

**Content reinterview survey (CRS)**—This was the largest content evaluation of the 1990 census. The procedure consisted of reinterviewing a sample of 12,800 respondents who had completed long-form household questionnaires in order to measure the response bias and variance associated with selected housing and population items. Between September and December 1990, field staff at the Bureau’s Hagerstown, MD office contacted the respondents, using computer-assisted telephone interviewing (CATI) techniques. Analysis found moderate inconsistency in the answers to questions about the description of the building, size of the lot, other

<sup>26</sup>As late as 1987, it had been proposed that the 1990 PES would consist of a sample of 300,000 housing units, but that number had to be reduced, largely for budgetary reasons. The 1980 PES had relied on about 168,000 households from the Current Population Survey, plus 100,000 more from the census.

<sup>27</sup>See, 1990 Census of Population and Housing, *Evaluation and Research Reports: Programs to Improve Coverage in the 1990 Census*, 1990 CPH-E-3 (Washington, DC: Government Printing Office, 1993).

housing characteristics, and agricultural sales. Response-variance type reinterviews found inconsistency in the low range for Hispanic origin and school enrollment, and in the moderate range for year of immigration and employment data. Females reported type of industry more consistently than males. Race data showed significant bias, particularly for Hispanics, in the "White" and "Other Race" categories.

**Alternative questionnaire experiment**—This involved mailing one of six alternative long-form (i.e., sample) census questionnaires to 42,000 randomly selected housing units in inner city areas to see how different from the traditional census questionnaire a form must be to improve response rates. (One of the forms, the control, replicated the regular 1990 questionnaire.) Response appeared best to the forms that varied most from the norm, both in structure and clarity of directions, and especially to the form that did not ask name, address, or relationship.

**Other projects**—These included the following: A master trace study, designed to create a data base for use in other REX projects by tracking 31,000 questionnaires through processing, was not completed. A macro-level consistency check (in the Population Division) analyzed the differences, by demographic characteristics, between census counts and corresponding counts from external sources. An integrated evaluation of error described the magnitude and relationship of error introduced by various operations and looked for differences, also by demographic characteristics, in response-error rates.

## Procedures and Operations

**Outreach evaluation survey (OES)**—The OES was similar to the 1980 knowledge, attitudes, and practices (KAP) survey, against which the CSMR compared the 1990 OES. The OES measured the effectiveness of the Census Awareness and Products Program (CAPP) and other 1990 census messages and materials, especially those targeted at minority populations, through two personal interviews of 5,000 individuals—one interview in January/early February 1990, before the census mailout, and a second in April and May 1990, after the households had received their questionnaires. As expected, far more people had heard about the census by April than in January, but outreach appeared to be more successful among Hispanics than Blacks.

The GEO identified sources of error in entering geographic codes. The Field Division had a whole set of studies, in which it used administrative and quality-assurance (QA) records to examine enumerator selection, training, and performance. The staff particularly analyzed the results of efforts to hire minority employees—a major census recruitment goal. Other field operations studied included S-night (enumeration in shelters), inner-city activities such as urban update/leave (UU/L) and

urban update/enumerate (UU/E), checks of parolees/probationers, and the effect of variable pay for enumerators.

## Quality Assurance Evaluations

Virtually all decennial census operations, ranging from materials preparation, USPS operations, field activities, FACT 90, coding, and editing, to data keying and computer processing incorporated quality-assurance (QA) procedures. More than 30 studies focused on these, as well as on the safeguards used to protect software and confidentiality.

The QA program for the 1990 census was modeled on W. Edwards Deming's total quality management philosophy and had four major goals:

- to build quality into census procedures and operations;
- to design a system capable of continuous improvement;
- to integrate responsibility for quality and production;
- to distinguish clearly between quality assurance and quality control.

Building quality into an operation as large, complex, and geographically dispersed as the 1990 census, and staffed largely by temporary employees, was a major challenge. To meet this challenge, Bureau planners designed census operations to be as efficient and straightforward as possible, paid particular attention to training staff and measuring what trainees learned, designed systems to measure worker performance and provide feedback to employees in time for them to implement the suggestions, and made a concerted effort to provide staff members with the tools needed to do a good job. To allow for continuous improvement, the quality assurance program established systems to measure work quality, quantify error characteristics, and deliver this information to managers and supervisors in a timely manner. In contrast to 1980, when production and quality responsibilities resided in different management areas (which had produced an adversarial relationship within the organization), the 1990 production staff was assigned responsibility for quality as well. Finally, the 1990 approach to quality involved the transition from the "inspect and repair" method used in 1980 to a much broader QA philosophy that embraced the concept that while management bore responsibility for how well an operation functioned, all employees contributed to the QA process.

The increased use of automation made it possible to apply the new QA approach much more broadly than was possible in 1980. With the placement of automation equipment in the DO's, more consistent application of procedures was possible, and consistency in implementation was equated to quality. Automation and the

associated ability to control the materials by identification number permitted questionnaires to be processed as they were received, thereby improving efficiency and allowing operations to begin before all the data had been collected.

Effective communication also was vital to the success of the 1990 QA program. This included the ability to obtain, evaluate, interpret, and distribute information to improve the planning and design of an operation and to help identify problems and their causes during an operation. Among the Bureau's efforts to institutionalize and encourage communications were the establishment of inter- and intra-agency working groups to plan and monitor operations, reducing the ratio of supervisors to employees, the creation of quality circles (mainly in the PO's) to discuss quality issues and resolve problems, the use of on-site observers in DO's and PO's to sensitize managers to QA issues and monitor performance, and the establishment of a problem resolution system in the PO's.

Educating and training the production staff were key components of the QA program. The majority of the more than 400,000 temporary jobs created during the census were for field enumerators. Enumerator training included learn-by-doing exercises and substantial emphasis on map-reading, better training materials than were available during the 1980 census, and greater use of multimedia training (including videotapes and in some cases, computer based training).

One of the basic objectives of the Bureau's QA plan was to accurately measure performance by identifying errors, documenting their characteristics, and relaying this information to management so that timely feedback could be given to employees. Having developed appropriate measurement techniques (such as pre- and post-operational sampling, concurrent monitoring, reinter-view, and suppression) for the various operations, Bureau managers were better able to assess data quality, identify sources of error quickly and take appropriate measures to resolve the problems.

## LEGISLATION AND LITIGATION

### Congressional Oversight

During the 1990 census period, the Census Bureau came under the jurisdiction of the House Committee on Post Office and Civil Service's Subcommittee on Census and Population (renamed the Subcommittee on Census, Statistics and Postal Personnel in 1993). In the Senate, it was the Subcommittee on Government Information and Regulation (renamed the Subcommittee on Regulation and Government Information in 1993), a component of the Committee on Governmental Affairs.<sup>28</sup> The

<sup>28</sup>The Senate Committee on Governmental Affairs passed Census Bureau jurisdiction around among several of its subcommittees: Energy, Nuclear Proliferation, and Government Processes (1983-86);

GAO, an arm of the Congress, reported to the subcommittees on specific topics of interest as the 1990 census progressed from early planning through the issue of whether to statistically adjust the counts. More than 70 congressional hearings at which Census Bureau witnesses testified, primarily before the House oversight subcommittee, dealt with the 1990 census during the decennial census period.

### Public Laws Concerning the Decennial Census

Compared with 1980, the 1990 census involved relatively little legislative action. However, the Congress passed, and the President signed, several acts. One, in 1983, allowed the United States Postal Service to furnish lists of names and addresses to the Bureau as part of the 1984 Address List Compilation Test. Two laws in 1989 and 1990 permitted Federal civilian annuitants and military retirees to accept temporary appointments to work on the 1990 census without having their benefits reduced. These two acts helped the Bureau recruit and retain an important segment of its field work force. Other legislation excluded, but later restored, temporary workers' credits for census pay in determining eligibility for unemployment compensation.

### Other Legislative Issues

While not resulting in laws, a number of bills were introduced and debated during the decennial census period and had a significant effect on the 1990 census. For example, the issues of whether the apportionment counts should include Americans overseas and/or exclude undocumented immigrants were frequently linked together in both bills and debate.

**Enumeration of Americans overseas**—Until the latter part of 1989, the Bureau had not planned to count overseas military personnel, U.S. Government civilian employees, or their dependents in the 1990 census for apportionment purposes. Enumeration of Americans overseas had not occurred in 1980, but the 1970 census, taken when many members of the Armed Forces had been deployed abroad, had included overseas military personnel. Bipartisan calls in Congress for the enumeration of these groups in the 1990 census contributed to Commerce Secretary Mosbacher's decision, announced in August 1989, to apply the 1990 census residence rules to encompass all those mentioned above. At the time, the Department of Defense planned to take its own census of its overseas personnel concurrent with the 1990 census, but later limited itself to furnishing data on its overseas personnel and their dependents to the Bureau using administrative records. A related concern was how to allocate overseas military

Federal Services, Post Office, and Civil Service (1987-88); and Government Information and Regulation (1989-93).



personnel to a particular State. Defense Department military personnel and their dependents constituted nearly 87 percent of the total overseas count in 1990. The legality/constitutionality of including the overseas population in the apportionment counts, as well as the method of allocation, became subjects of litigation. (See *Franklin v. Massachusetts* in the "Litigation" section.)

**Undocumented immigrants in the apportionment counts**—This issue generated considerable controversy in both the Congress and the courts, involving unsuccessful legislative efforts—freestanding bills as well as amendments to appropriations bills—and a lawsuit (see *Ridge v. Verity* in the "Litigation" section) seeking to exclude undocumented people from the apportionment counts. In response, the Bureau cited a Justice Department opinion which stated that exclusion would be unconstitutional. The Bureau also asserted that there was no acceptable method of identifying such people for exclusion.

**Questionnaire content**—A number of bills sought to restore housing items that the Office of Management and Budget (OMB) had eliminated (see p. 14). Other bills dealt with the 1990 format and wording of the race question, specifically the response categories for Asians and Pacific Islanders. One such bill passed both Houses in 1988 but failed to become law because the President did not sign it. Recognizing the concerns in the Asian and Pacific Islander (API) communities for accurate detail, the Bureau decided to list the specific API categories used in 1980 in the 1990 question, rather than requiring a written-in entry in every case. If none of the API categories listed were appropriate, the respondent could then write in a specific one.

**Adjustment**—No 1990 census issue was more controversial than whether the counts should be statistically adjusted for any measured undercount (or overcount). In 1987 and subsequent years, Members of Congress introduced bills seeking adjustment, but none was ever reported out of committee. The issue, however, became the subject of litigation.

## Litigation

As of July 1995, the Census Bureau and/or the Department of Commerce had been or were defendants in 22 lawsuits related to the 1990 decennial census. The suits covered a broad range of topics, from statistical adjustment and the release of adjusted redistricting data tapes, to the current apportionment formula, to various aspects of census enumeration procedures, including application of the Bureau's "usual residence" rules.

**The Adjustment Decision and Related Litigation**—In conducting the decennial census, the Census Bureau attempts to enumerate every resident in the country. However, despite gallant efforts to accomplish this goal,

many people are missed or not counted. This phenomenon is termed the undercount. The Census Bureau has estimated the undercount in each decennial census since 1950. This undercount has been historically differential in nature, in that members of racial and ethnic minorities as well as residents of particular geographic locations, are missed at a disproportionately higher rate than others. For 1990, the Census Bureau developed a post-enumeration survey (PES) for purposes of checking the accuracy of the final count immediately after the completion of the census, and to determine a proper statistical adjustment, if feasible, to correct for the undercount. (For a brief description of the PES and other coverage evaluation programs, see pp. 37-38; for a more detailed discussion, see ch. 11 of this *History*.)

Whether to adjust the census population figures for over- and under-counts was a major issue in the 1990 census. The issue had arisen during the 1980 census as well. The Census Bureau Director, Vincent Barabba, announced in December of 1980 that the Bureau would not adjust the 1980 population count totals unless the courts required it. He based his decision chiefly on two factors—(1) the quality of the 1980 census, which was considered good, and (2) the absence of any accurate measure of the number and distribution of undocumented aliens in the country, which affected the Census Bureau's ability to adequately measure the undercount. The plaintiffs in 36 adjustment-related lawsuits, the last of which was decided in 1987, were ultimately unsuccessful in their attempts to have the 1980 census adjusted.<sup>29</sup> Thirteen lawsuits were filed related to adjustment of the 1990 census. Some suits sought adjustment of the census and/or release of the adjusted data tapes for redistricting. Other suits sought to prevent an adjustment.

In October 1987, Commerce Department officials announced that the 1990 census figures would not be adjusted. The following year, the most prominent and significant of the 1990 adjustment lawsuits was filed in the U.S. District Court for the Eastern District of New York (*City of New York v. U.S. Department of Commerce*). The plaintiffs included a number of States, counties, cities (including the City of New York), organizations, and individuals from the participating jurisdictions. The defendants were the President, Commerce Department officials, and the Clerk of the U.S. House of Representatives. The plaintiffs requested an injunction to preclude the taking of the 1990 census unless it were subject to an adjustment. They argued that since census procedures would inevitably lead to an undercount of plaintiff jurisdictions, the Department of Commerce's 1987 decision not to adjust would violate their Constitutional rights and would result in an unexpected loss of political representation and Federal funding. On July 17, 1989, the parties agreed to stay the suit. The agreement

<sup>29</sup>Cf. 1980 Census of Population and Housing: *History*, series PHC80-R-2 (1986-89), chs. 1 and 10.

stipulated that the plaintiffs would withdraw their motion seeking to enjoin the census in exchange for the Department's commitment to reconsider adjusting the 1990 census subject to certain preset guidelines. The Bureau would take the traditional census as accurately as possible, with the possibility of an adjustment following the enumeration. According to the agreement, the Secretary of Commerce would determine whether to adjust no later than July 15, 1991.

In arriving at a final determination, Secretary Robert Mosbacher called for public comment<sup>30</sup> and also received advice from 10 officials: the Under Secretary of Commerce for Economic Affairs (Michael Darby), the Census Bureau Director (Barbara Everitt Bryant) and the members of a Special Advisory Panel of eight experts—four chosen by the plaintiffs and four by the defendants in the *New York* lawsuit. The panel members split evenly in their advice, four supporting adjustment and four opposed. Under Secretary Darby recommended against adjustment. Census Bureau Director Bryant recommended in favor of adjustment, citing a majority opinion by the Bureau's internal Undercount Steering Committee that, on balance, the adjusted numbers were more accurate than the unadjusted figures.

The Secretary evaluated the adjusted counts in terms of eight guidelines<sup>31</sup> that had been developed as criteria for the adjustment decision. On July 15, 1991, he announced that the 1990 decennial census would not be statistically adjusted.<sup>32</sup>

In deciding against adjustment, Secretary Mosbacher acknowledged that the adjustment would likely lead to more accurate figures at the national level and for racial and ethnic minorities. There was a division of opinion among the Secretary's advisers as to whether the adjusted counts were more or less accurate at the State and local levels. Secretary Mosbacher concluded that the adjusted numbers would not lead to greater distributional accuracy, the appropriate measurement relating to apportionment of the House of Representatives. He also expressed concern that uncertainty in the adjustment methodology and its assumptions might lead to disagreement over the numbers, and further research might weaken the evidence supporting adjustment. He also felt that adjustment might lend itself to political manipulation.

After the Secretary's decision not to adjust, the plaintiffs returned to court seeking an order compelling the Department to adjust the 1990 census to rectify the acknowledged undercount of certain minority groups.

The plaintiffs complained principally of loss of representation and Federal funds, also alleging that the decision violated the July 1989 agreement, the Administrative Procedure Act (APA), and the Constitution, and was influenced by partisan political considerations. The States of Wisconsin and Oklahoma joined the suit on the side of the Government.

In May 1992, District Judge Joseph McLaughlin held a 13-day trial, followed by a decision in April 1993. While finding much substantive merit in the plaintiffs' case, Judge McLaughlin decided for the defendants, applying an APA standard of judicial review, ruling that the Secretary's decision was neither arbitrary nor capricious.<sup>33</sup>

The plaintiffs appealed to the U.S. Court of Appeals for the Second Circuit in July 1993, arguing that the District Court had incorrectly applied an APA standard of review to the case, whereas they felt that the appropriate standard was one under the Constitution. The Second Circuit heard oral arguments in January 1994. In August of that year, the Circuit Court set aside the ruling of the District Court and agreed with the plaintiffs' contention that the lower court had applied the wrong standard of review. The Second Circuit Court reasoned that since, in its view, the Government chose to use the less accurate, unadjusted counts, causing a disparate and harmful impact upon minorities then, if the decision were to stand, the Government had to demonstrate that such a position (1) furthered a legitimate governmental objective, and (2) was essential for the achievement of that objective. The Court returned the case to the District Court for a determination of legitimate governmental objective.<sup>34</sup>

In June 1995, the Government filed a petition for a writ of *certiorari*<sup>35</sup> in the U.S. Supreme Court, seeking review of the Second Circuit Court's decision. The States of Wisconsin and Oklahoma had filed their own *certiorari* petitions earlier. On June 30, the plaintiffs filed a response brief requesting that the Supreme Court deny the petition. On the same day, the States of Indiana and Ohio jointly filed an *amicus curiae* ("friend of the court") brief recommending that the Court grant the *certiorari* petitions. As of July 1995, the Supreme Court had yet to decide whether to hear the case. Additionally, similar suits, originating in Florida, Georgia, Illinois, Texas, and Michigan, had either been dismissed, consolidated, or were awaiting further court action at that time.

Two suits, on the other hand, sought to prevent adjustment; these were filed in 1991 by Washington

<sup>30</sup>*Federal Register*, Vol. 56, May 24, 1991, pp. 23860-23864.

<sup>31</sup>On March 15, 1990, the Department published final guidelines (*Federal Register*, Vol. 55, No. 51, March 15, 1990, pp. 9838-9861). On April 11, 1990, plaintiffs challenged them, stating that they were biased against adjustment. On June 7, 1990, the court approved the guidelines.

<sup>32</sup>Department of Commerce, Office of the Secretary, "Adjustment of the 1990 Census for Overcounts and Undercounts of Population and Housing; Notice Final Decision." *Federal Register*, Vol. 56, No. 140, July 22, 1991, pp. 33582-33642; Docket No. 91282-1181.

<sup>33</sup>*City of New York v. U.S. Department of Commerce*, 822 F. Supp. 906, 739 F. Supp. 761, 713 F. Supp. 48.

<sup>34</sup>34 F. 3d 1114.

<sup>35</sup>A petition for a writ of *certiorari* is a request that a higher court decide to hear a case and review a lower court's decision. The term most commonly refers to such requests made of the U.S. Supreme Court.

(dismissed) and Wisconsin (dismissed—Wisconsin intervened in the *New York* case along with Oklahoma).

The California Senate, Assembly, and the Florida House of Representatives each sued to obtain the adjusted redistricting data files for their States. These tapes had originally been produced in the event that Secretary Mosbacher had decided in favor of adjustment. The Commerce Department had sought to withhold the adjusted data tapes on the grounds that they were predecisional and deliberative in nature and therefore not subject to release under the Freedom of Information Act and/or that the plaintiffs had no constitutional right to obtain them. The Department prevailed in the California Senate and Florida House of Representatives cases. However, the California Assembly was successful in its suit and under court order, the Commerce Department gave the Assembly the adjusted data it wanted.

**Constitutionality of the apportionment formula**—Two suits challenged the constitutionality of the current apportionment formula employed by Congress since 1941 to apportion the U.S. House of Representatives, known as the “equal proportions” method,<sup>36</sup> charging that it deprived certain citizens of fair and equal representation. The State of Montana claimed that as a result of Congress’s applying this method, rather than a different one, to the 1990 census, it lost a seat in the U.S. House of Representatives, and it now had a single congressional district far larger than any other in the country. A three-judge court agreed with the State, but the Supreme Court decided that Congress had exercised its apportionment authority within constitutional limits, thus, denying Montana’s claim.<sup>37</sup> The State of Massachusetts, which also had lost a seat, called for a different apportionment method as well, but also contested the legality and/or constitutionality of the Government’s inclusion of Federal military and civilian employees and their dependents living overseas in the 1990 apportionment counts. Having already declared the “equal proportions” method proper, the Supreme Court addressed the latter issue and concluded that the Secretary of Commerce’s decision was consistent with the Constitution.<sup>38</sup>

**Census design and/or procedures**—More than 40 Members of Congress, plus several States, the Coalition for Constitutional Reapportionment, and the Federation for American Immigration Reform (FAIR) sought, in 1988, to exclude undocumented aliens from being counted in the 1990 census for apportionment purposes. The Federal court ruled that the plaintiffs lacked standing to sue because they could not demonstrate with sufficient

specificity which States would lose (or gain) representation in Congress as a result of the inclusion of illegal aliens in the apportionment counts. (FAIR had brought a similar suit in the 1980 census, but that case was also dismissed on similar grounds.)

In a 1991 suit filed before the July 15 adjustment decision, the City of Chicago complained that the census of its residents had been deficient, therefore depriving them of Federal and State funding as well as full and fair representation. The District Court dismissed the suit and suggested that the plaintiffs wait for the outcome of the Secretary’s adjustment decision and/or the then pending count question resolution (CQR) process, since either of these had the potential to affect the city’s final census count. After the announcement of the Secretary’s decision against adjustment, the plaintiffs pursued the CQR process and did not refile their suit.

The District of Columbia contended in Federal Court that the Census Bureau’s application of its “usual residence” rules to count the inmates of the District’s Lorton prison (located in Virginia) in Virginia rather than in the District was unconstitutional, in violation of Title 13, and arbitrary and capricious. On April 3, 1992, the Court issued a ruling in favor of defendants, stating that the Census Bureau’s application of its “usual residence rules” with regard to Lorton inmates was a rational decision that was not arbitrary or capricious, nor did it violate the constitutional command of the census clause.

A group of plaintiffs including the National Law Center on Homelessness and Poverty, the United States Conference of Mayors, the City of Baltimore, Maryland, the City and County of San Francisco, California, and 11 individuals challenged the design, implementation, and results of the 1990 S-night operation.<sup>39</sup> Among other claims, the plaintiffs charged that the Census Bureau’s allegedly deficient S-night results would cause them to receive reduced funding for programs that benefit the homeless. The plaintiffs wanted the Bureau to disclaim the accuracy of its S-night counts, and adjust the counts based on another enumeration. On September 15, 1994, the District Court ruled in favor of the Census Bureau, stating that the agency’s alleged failure to count large numbers of homeless persons did not constitute a violation of its constitutional duty to conduct the decennial census, since individuals do not have a “right” to be counted. The plaintiffs filed their appeal in the U.S. Court of Appeals for the District of Columbia Circuit on October 24, 1994. As of June 1995, the case was still pending before that court.

<sup>36</sup>For a brief history of the various methods used to calculate the apportionment of seats in the U.S. House of Representatives, see U.S. Bureau of the Census, “Counting for Representation: The Census and the Constitution” (1987).

<sup>37</sup>*U.S. Department of Commerce v. Montana*, 503 U.S. 442 (1992).

<sup>38</sup>*Franklin v. Massachusetts*, 112 S. Ct. 2767 (1992).

<sup>39</sup>S-night was a census operation that took place during the evening hours of March 20 and the early morning hours of March 21, 1990. It was designed to count persons living in preidentified public shelters (including those for abused women) and places of commerce such as bus or train stations, and persons visible on the streets. For a description of the program, see ch. 6 of this *History*.

## DECENNIAL CENSUS COSTS

The 1990 census cost nearly \$2.5 billion, as compared with \$1.1 billion spent for the 1980 census. As in the past, a number of factors contributed to the increase: A 10-percent growth in population, monetary inflation, the costs of automation, further coverage improvement programs, and so forth. Obligations for the decennial year, 1990, constituted 54 percent of the total cost for the period, while for 1980, when buildup began somewhat later, 61 percent of the obligations came in the peak year. (See table 1.) See app. A to the entire history for more detail.

Table 1. Total 1990 Decennial Census Obligations, by Fiscal Year

Fiscal year	Decennial obligations (in thousands of dollars)	Percent <sup>1</sup> of total 1990 decennial obligations
Total . . . .	2,492,830	100.0
1984 . . . . .	13,545	0.5
1985 . . . . .	27,878	1.1
1986 . . . . .	46,540	1.9
1987 . . . . .	71,681	2.9
1988 . . . . .	190,437	7.6
1989 . . . . .	364,927	14.6
1990 . . . . .	1,382,142	55.4
1991 . . . . .	246,105	9.9
1992 . . . . .	82,187	3.3
1993 . . . . .	57,896	2.3
1994 <sup>2</sup> . . . . .	9,492	0.4

<sup>1</sup>Rounded. <sup>2</sup>Although no new funding was appropriated for the 1990 decennial census in FY 1994, funds made available from prior year deobligations allowed the Census Bureau to complete work on the 1990 census during FY 1994.

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# CHAPTER 2.

## Planning the Census

### INTRODUCTION

The 1990 census marked the bicentennial of census-taking in the United States and its territories. Compared with its predecessors, the task for 1990 was much more complex. Collecting the information for the anticipated 106 million housing units and nearly 250 million people and completing the process in a timely and accurate manner required much preparation.

Planning for the 1990 census included critiques of the 1980 experience, internal Census Bureau review, congressional review, consultation and contacts with data users, and a series of procedures and content tests. This chapter will focus on internal assessments and reviews of the 1980 census; the extensive contacts with data users; internal Bureau planning, organization, and decision-making; and the 1990 test census and dress rehearsal programs.

The preparations for 1990 actually began with evaluation programs conducted during and immediately following the 1980 census. The evaluations were used to assess the quality and effectiveness of many aspects (e.g., data collection, quality assurance, publicity) of the 1980 census. Equally important, they were used as the first planning tool to direct the Bureau toward the development of the 1990 census.

The official 10-year cycle began on October 1, 1983. During the first year's preparations, the Bureau specified its major goals and specific objectives for 1990. The major goals included (1) cost effectiveness, (2) more timely release of 1990 census data products relative to similar 1980 products, and (3) maintenance of a high rate of coverage of population groups and the Nation's housing stock. Specific objectives for 1990 were to (1) define the basic concept of enumeration (possibilities included using administrative records to supplement a counting procedure and developing methodologies to estimate an under- or overcount at the appropriate geographic levels), (2) evaluate and select the best data-collection methodologies by testing alternatives rather than assuming them, (3) develop efficient coverage-improvement procedures, (4) increase the use of automation for geography, address control, payrolling, and data collection and processing, (5) decrease dependency on temporary staff, and (6) improve outreach techniques (since public cooperation was vital for a successful census).

Also, in the first official planning year, several types of meetings were held with data users. In the following year, the first major test was conducted. During 1985-1987, the

Bureau held six test censuses to evaluate alternative data-collection and processing methodologies, different versions of the questionnaire, and other aspects of the census-taking process.

Additional considerations in the planning process involved meeting several key deadlines. For instance, the Bureau was required, by law, to inform the Congress of the general subjects to be covered 3 years before, and the specific questions 2 years before, Census Day (April 1, 1990). A final dress rehearsal was conducted in 1988 to refine census procedures. Major preparatory activities, such as compiling lists of addresses, plotting field maps, and preparing questionnaires, had to begin early in 1988, over 2 years before Census Day. With the conclusion of the dress rehearsal, 1990 census operations moved into their preliminary stage.

### The Decennial Planning Division

Early in 1990 census planning, the Bureau decided that the 1990 census would be a smoother and more efficient operation if planning and policy-making were separated from data processing. Therefore, in April 1983, the executive staff divided the Decennial Census Division into two parts: the Decennial Operations Division (DOD) to deal with various automation issues and the Decennial Planning Division (DPLD) to concentrate on the management and coordination of the census and its budget.<sup>1</sup> The DPLD did the following for 1990:

- Provided overall direction for program planning and coordination.
- Determined program priorities and policy for the program issues.
- Assigned functional responsibilities to other Bureau divisions.
- Developed budget requirements, time schedules, and a progress-reporting and control system.
- Monitored and documented program and budget status.
- Established interdivisional channels for supplying data and associated materials.
- Acted as liaison with the Department of Commerce, advisory committees, and Federal, State, and local officials concerning legislative and program needs.
- Coordinated committees' and agencies' participation in decennial program activities.

<sup>1</sup>As a result of budget reductions and the reassignment of personnel, the DPLD and DOD were merged back together to form the Decennial Management Division in June 1992.



- Coordinated and monitored contractual services procured for the program.
- Planned methodologies and organized test census and research programs.
- Developed publication and other data-dissemination plans.

## CONSULTATION AND CONTACTS WITH DATA USERS

In planning the 1990 Census of Population and Housing, the Census Bureau consulted a broad spectrum of data users. A series of local public meetings throughout the country (and territories) obtained information about the data needs of local civic, business, and professional organizations. In another group of meetings, State planning agency officials were invited to respond to the Bureau's preliminary data-collection and tabulation plans. Under the auspices of the Office of Management and Budget (OMB), representatives of more than 90 Federal agencies met periodically over several years to outline Federal data needs based on existing legislation, provide ideas on census content, and review other matters related to the census. Eight public advisory committees, including four representing minority populations, commented on most aspects and phases of the census. Regional meetings with groups of American Indians, Eskimos, and Aleuts served as a forum for the exchange of ideas on the best ways to count their populations. Bureau officials conducted an extensive outreach program aimed at national and community minority organizations to inform them of 1990 census plans, listen to their comments, and solicit their help in the data-collection effort. The Bureau also organized a series of conferences where experienced data users and staff examined and made recommendations concerning such issues as the concept of enumeration and questionnaire content.

Throughout the decennial cycle, numerous contacts with other data users, not included in the programs discussed here, generated additional suggestions on census planning and procedures.

### Local Public Meetings

As part of the planning process for the 1980 census, the Bureau gave knowledgeable data users and other interested members of the public opportunities to comment on the 1970 census and make suggestions for the upcoming census. In 1974 and 1975, local chambers of commerce, chapters of professional associations, councils of government, business and university groups, and other organizations promoted and sponsored a nationwide series of local public meetings (LPM's) at which Bureau representatives described the status of 1980 census planning and collected recommendations on a wide variety of census-related issues. Since these meetings produced important and useful suggestions, there was a similar program for the 1990 census. In addition, the staff proposed a series of "mini" local public meetings to be held in conjunction with

the annual meetings of such professional organizations as the American Public Health Association and the National Education Association. However, poor response from potential participants led to the cancellation of the "mini" meeting program after two attempts.

Between April 1984 and October 1985, LPM's were held in 65 cities, covering all 50 States, the District of Columbia, Puerto Rico, and the United States Virgin Islands. (For a complete list of the dates and locations of these meetings, see app. 2A.) Working closely with headquarters and regional office staff, State data centers<sup>2</sup> and their affiliates took the lead in organizing and promoting these meetings. Local civic, business, and professional associations and local chapters of national organizations (such as the American Library Association, American Marketing Association, American Planning Association, American Statistical Association, National Association of Business Economists, League of Women Voters, Urban League, National Association for the Advancement of Colored People, and United Way) cosponsored the meetings and publicized them among their members.<sup>3</sup> Local cosponsors were asked to provide meeting sites, select chairpersons, and prepare and distribute meeting announcements to the print and broadcast media. Bureau staff worked closely with the organizers, and agendas were jointly devised.

Most LPM's lasted a full day, although in several smaller cities that had fewer than 30 persons in attendance, a half day proved to be sufficient. Prior to the meetings, each attendee received a kit containing a cover letter, the agenda, and issue papers (written by Bureau experts) describing the proposed content of the census, together with a list of questions and a request for comments.

A total of 5,259 persons, or an average of 81 persons per meeting, attended the LPM's. The participants represented the following groups:

Local government	31%	Library	6%
State government	23%	Public service group <sup>3</sup>	5%
University	9%	Other <sup>4</sup>	5%
Business	8%	Federal Government	4%
Community organization	7%	Trade/professional <sup>5</sup>	2%

<sup>2</sup>The State Data Center (SDC) Program was launched in 1978 as a cooperative effort between the Census Bureau and four States (Alabama, Arizona, Louisiana, and North Carolina) to disseminate census data to the public through a network of State agencies, universities, libraries, and regional and local governments. By 1988, all 50 States, the District of Columbia, Puerto Rico, Guam, and the U.S. Virgin Islands had joined the program. While the SDC structure varied from State to State, it usually included a major State executive or planning agency, one or more State universities, the State library, and a network of affiliated data centers throughout each State. (For more details on the SDC Program, see ch. 10.)

<sup>3</sup>The Census Bureau also publicized these meetings on its electronic bulletin board, but this network was still in its infancy in the mid-1980's and could only reach a limited audience with the announcements.

<sup>4</sup>This category includes representatives of hospitals, utilities, and not-for-profit research organizations.

<sup>5</sup>This category includes media representatives and private citizens.

<sup>6</sup>This category includes chambers of commerce and public interest groups.

The meetings generally followed a standard pattern. After welcoming remarks by the chairperson, Bureau representatives outlined the objectives of the meeting, described the 1990 planning process, summarized the issue papers, and elicited suggestions from the audience.

The program resulted in more than 35,000 comments. Participants made recommendations on precensus activities, the relationship between the Bureau and local communities regarding the census, data collection and enumeration procedures, questionnaire materials and design, subject content, data tabulations, data dissemination, user services, and geographic areas. Their input was important in planning the census. The most frequent comments included confusion about the need for two separate questions on race and Spanish/Hispanic origin; suggestions for improving the local review program; support for the collection and publication of specific data on the disabled population, children, and the elderly; earlier release of data products; and more information on the availability of extracts from the Bureau's Topologically Integrated Geographic Encoding and Referencing (TIGER) System (see ch. 3 on census geography).

### **Reapportionment and Redistricting Stakeholders' Conference**

Early in the planning for the 1980 census, Bureau staff met with the National Conference of State Legislatures (NCSL) and representatives of the individual States and the Congress to obtain information on the need for and feasibility of producing census data for redistricting purposes and to solicit suggestions. After determining that redistricting following the 1970 census required small-area census data, the Bureau identified the production of this information as a priority planning goal for 1980. In 1975, Congress enacted Public Law (P.L.) 94-171, which required that the Bureau give State Governors and legislatures census population figures for small areas within 1 year after Census Day. The Bureau established the P.L. 94-171 Program, in which Bureau staff continued to meet and work with State officials on these issues.

Building on the success of the 1980 redistricting program, in June 1982, the Bureau established an internal committee to review the strengths and weaknesses of the 1980 effort and to identify unresolved issues relating to the 1990 data program. The committee arranged for the NCSL to poll State legislatures about the time deadlines for redistricting in the various States and the geographic levels for which census data were needed. Upon reviewing the NCSL's report, the Bureau concluded it needed more detailed information to develop an effective redistricting data program. The staff invited a cross-section of State legislative, minority, political party, and Federal representatives to the Reapportionment and Redistricting Stakeholders' Conference, held on October 3-5, 1983, in Chantilly, VA. Due to budgetary and logistical constraints, conference participation was limited to approximately 55 attendees; selection criteria for State representatives included geographic balance, type of participation in the 1980 program,

reported problems with 1980 census data, and recommendations from the NCSL. Bureau staff summarized the results of the NCSL's 1982 survey and described the 1990 planning process. Participants were divided into separate working groups to consider four major topics: Timing of the receipt of census data and data discrepancies, block-level census data vs. census data for election precincts, data items and data delivery, and alternative approaches for integrating election precincts into the Census Bureau's geographic structure. The participants discussed the individual group findings in a plenary session and formulated final recommendations for the 1990 P.L. 94-171 Program.

Major recommendations were (1) State legislatures that face legal deadlines for the completion of redistricting plans should be furnished with preliminary census maps (showing blocks,<sup>7</sup> census tracts and block numbering areas,<sup>8</sup> counties, county subdivisions, and incorporated places) in 1989 and preliminary census figures late in 1990; (2) the Bureau should prepare and deliver 1990 redistricting data in enough time for States to meet their legally mandated deadlines; (3) the Bureau should not adjust<sup>9</sup> the 1990 census unless the procedure could be carried down to block and voting district levels and cover total count, major race groups, Spanish/Hispanic origin, and age (18 years old and over) without jeopardizing the data delivery deadline of April 1, 1991; (4) the Bureau should avoid large geographic blocks (e.g., those encompassing an entire subdivision) and noncontiguous block groups; (5) the Bureau should not attempt to identify illegal aliens in the 1990 census; and (6) residency rules for college students should not change (i.e., students should be counted in the areas where they attend college).

### **Interagency Working Groups**

In October 1984, the Census Bureau sent letters to the heads of all Federal departments and agencies informing them of the establishment of 10 interagency working groups (IWG's) organized along questionnaire content lines and chaired by Bureau staff. The purpose of the IWG's was to discuss the Federal requirements for data from the 1990 census and the geographic levels for which the data were needed, based on current legislative requirements. An IWG was formed for each of the following topics:

<sup>7</sup>Census blocks are small geographic areas, bounded on all sides by visible features such as streets, roads, streams, and railroad tracks, and by invisible boundaries such as city, township, and county limits, property lines, and short, imaginary extensions of streets and roads, and identified for the purchase of data tabulation. For more information on census geography, see ch. 3.

<sup>8</sup>Census tracts and block numbering areas are small, relatively permanent (remain consistent from census to census to allow for statistical comparisons over time) statistical subdivisions of a county. Census tracts were delineated for all metropolitan areas and other densely populated counties for the purposes of data tabulation and comparisons. They generally range in size from 2,500 to 8,000 persons. For more information on census geography, see ch. 3.

<sup>9</sup>A statistical modification to census figures, based on a post-census survey, for correction of undercounts or overcounts. For more information on count adjustment, see ch. 11 on the census research and evaluation program and ch. 12 on legislation and litigation.

- Housing
- General demographic data
- Race and ethnicity
- American Indians and Alaska Natives
- Institutional populations
- Education
- Health and disability
- Transportation
- Labor force and occupation
- Income and poverty

Agencies were asked whether they wished to participate in one or more of the IWG's. The agencies received a schedule of the proposed IWG agendas from the initial meetings through completion of the final reports (by April 15, 1985). The response was extremely positive; more than 335 representatives from 35 departments, agencies, and independent commissions took part.

The final IWG reports generally included questionnaire content recommendations ranked in the order of significance, designation of the geographic levels for which various data were needed, legislative and programmatic uses of census data, and, in some cases, suggestions for improving or modifying operational and publication programs. The recommendations were wide-ranging and thorough, and Bureau managers and subject-matter specialists studied them closely.

At the time the IWG's were meeting, the staff considered adding a small (1- or 2-percent) supplemental sample to the planned data-collection effort involving 100-percent and primary sample questionnaires. The IWG's were asked to identify their data needs and to specify whether they could be met using the 100-percent form or the primary or supplemental samples. Some IWG's considered a supplemental sample in their recommendations, while others did not. In June 1986, operational complexities and costs forced the Bureau to abandon the proposal.

The IWG's provided valuable information about specific questions that Federal agencies wanted to add to or delete from the census. Copies of the final IWG reports were sent to the Federal Agency Council (see below) for its review and consideration.

### Federal Agency Council

An important source of advice on the content of the 1990 census questionnaires and on other aspects of the census program, including the data tabulations, was the Federal Agency Council on the 1990 Census of Population and Housing (FAC—originally called the Federal Agency Council for Demographic Censuses). Such councils were organized for the 1960, 1970, and 1980 censuses and, at the request of the Census Bureau, the Office of Management and Budget (OMB) established the council again for 1990 and devised procedures to ascertain Federal departments' and agencies' census data needs. The OMB sent letters to all appropriate senior officials describing the purpose of the

FAC, requesting information about each agency's use of 1980 census data, and asking for a designated representative. (See box for the list of participating agencies.)

#### Federal Agency Council (FAC) Membership

##### Executive agencies—departments

Agriculture  
 Commerce  
 Defense  
 Education  
 Energy  
 Health and Human Services  
 Housing and Urban Development  
 Interior  
 Justice  
 Labor  
 Transportation  
 Treasury  
 Veterans Affairs [Veterans Administration]

##### Independent establishments and Government corporations

ACTION domestic volunteer service programs  
 Commission on Civil Rights  
 Equal Employment Opportunity Commission  
 Federal Emergency Management Agency  
 National Commission on Libraries and Information Science  
 National Council on the Handicapped  
 National Endowment for the Arts  
 National Science Foundation  
 Office of Management and Budget  
 Office of Personnel Management

The major FAC objectives were to advise OMB about Federal requirements for census data and to act as a forum for the exchange of information about 1990 census plans. The FAC focused on broad aspects of the census, such as questionnaire content, census design, operational tests, data products, and media proposals. Specifically, the OMB asked each department and agency to describe its statutory requirements for census data, the frequency and types of use, and the geographic level (Nation, State, metropolitan area, county, block, etc.) for which data were needed. This was vital to the questionnaire development process. While the Bureau considered numerous data needs for all levels of government, legally mandated uses became the deciding factors when weighing conflicting requests. In addition to meeting in plenary sessions to consider joint needs, the FAC chairperson met with each agency's representatives to discuss their specific requirements.

The council held its first meeting in November 1984. Focusing on questionnaire content, it reviewed in depth the issues, analyses, and recommendations in the 10 IWG's reports. FAC members questioned the chairperson of each group after listening to a summary of its recommendations.

They had a comprehensive list of the IWG recommendations that noted items included in census testing plans. Based on their examination of this material, council members voted on whether they agreed with the plan to test or remove from consideration each of approximately 200 questions recommended by the IWG's.

The FAC completed its deliberations on July 24, 1985, and tallied the votes; in most cases, it agreed with the testing plans. The Bureau reviewed the results, along with other sources of information, to develop a set of test questionnaires to be used in the 1986 National Content Test (NCT) (see p. 36). The items given preliminary endorsement by the FAC and tested in the NCT were ranked as having high, medium, or low priority. There was only one of the last—annual miles driven.

### Census Advisory Committees

Eight of the Bureau's census advisory committees<sup>10</sup> played important roles in planning all phases of the 1990 decennial census. Committee members represented professional associations, academic institutions, business groups, community and national organizations, consumer and business groups, elected public officials, and the clergy. The purpose of the committees was to offer expert advice from outside the Federal Government on issues relating to the 1990 census and other Bureau programs. Suggestions and recommendations focused on data needs, questionnaire content and design, coverage improvement procedures, publicity and minority outreach, and policy issues, including whether to adjust census counts. Members' terms usually lasted for 3 years; regulations allowed members to serve a maximum of two consecutive terms.

**Standing committees.** There were four standing advisory committees. The oldest, established in 1919 to advise the Director on plans for the 1920 census, was the Census Advisory Committee of the American Statistical Association. The others were those of the American Marketing Association (1946), the American Economic Association (1960),<sup>11</sup> and on Population Statistics<sup>12</sup> (1965). Every 6 months, they officially reviewed the Bureau's programs as a whole, as well as the 1990 decennial census procedures and policies.

**1990 Census Advisory Committees.** Building on the success of the minority-population committees established for the 1980 census and attempting to further improve

enumeration accuracy of minority populations for the 1990 census, the Bureau (through the Department of Commerce) established four committees, representing different communities for the following populations: Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native. The last, new for 1990, was established in accordance with a recommendation at the Joint Meeting with Minority Groups (see p. 9). After chartering in May 1985, the initial meetings took place in the spring of 1986. Their focus was to advise on planning for the 1990 census, as well as to be a channel of communication on outreach, publicity, and data needs. Beginning in the spring of 1986, the committees met every 6 months (in the spring and fall) through the fall of 1990; thereafter, they met annually.

### Regional American Indian and Alaska Native Meetings

Given the diverse groups within the American Indian and Alaska Native (AIAN) population, and logistical problems associated with unique local conditions, the Bureau, with the assistance of AIAN organizations, convened a series of regional meetings in appropriate locations across the country. These were part of an effort to increase understanding and communication among and between the AIAN communities and the Bureau.

Planning for the 1990 census included two rounds of regional meetings. In the first round, Bureau personnel met with representatives of urban American Indian organizations, as well as tribal and Alaska Native village governments where appropriate, in the following 12 cities:

Albuquerque, NM (May 15, 1985)  
San Diego, CA (December 5, 1985)  
Phoenix, AZ (May 16, 1985)  
Nashville, TN (February 20, 1986)  
Seattle, WA (September 13, 1985)  
Boston, MA (February 29, 1986)  
Anchorage, AK (September 17, 1985)  
Minneapolis, MN (August 5, 1986)  
Oklahoma City, CA (October 29-30, 1985)  
Bismarck, ND (August 7, 1986)  
Sacramento, CA (December 3, 1985)  
Arlington, VA (September 23, 1986)

An additional meeting, separate from the regional ones, was held in Oklahoma City, OK, in November 1985 to discuss the collection, tabulation, and publication of 1990 census data pertaining to American Indian populations in historic reservation areas of Oklahoma (30-35 former reservations dissolved by the Federal Government in 1905-1907 but which retained a degree of administrative and tribal identity).

During the second round of nine meetings, final plans were presented to tribal leaders and directors of community-based organizations, both rural and urban, in the following cities:

Kansas City, MO (November 1-2, 1988)  
San Diego, CA (March 2-3, 1989)

<sup>10</sup>An additional committee, the Census Advisory Committee on Agriculture Statistics, met biennially with Bureau staff to provide advice and guidance on the agriculture census and related topics.

<sup>11</sup>Between 1919 and 1937, representatives of the American Statistical Association and the American Economic Association formed a joint committee (the General Advisory Committee) that advised the Census Bureau on organizing and taking decennial censuses. In 1937, this group was reconstituted, with all its members representing the American Statistical Association. Between 1937 and 1960, the American Economic Association was not represented by any particular committee.

<sup>12</sup>Name changed in April 1993 to the Census Advisory Committee of the Population Association of America.

Denver, CO (November 29-30, 1988)  
Baltimore, MD (March 14-15, 1989)  
Denver, CO (December 1-2, 1988)  
Baltimore, MD (March 16-17, 1989)  
Seattle, WA (January 25-26, 1989)  
Anchorage, AK (May 15-16, 1989)  
San Francisco, CA (February 28 and March 1, 1989)

At the first round, Bureau staff members made four presentations on issues relating to population, housing, geography, and outreach. Each presentation summarized the 1980 census experience pertaining to the topic, posed a series of issues to be addressed by the group, and described the current plans for the 1990 census. Discussions focused on issues of definitions, enumeration procedures and policies, questionnaire content, and map usage. Time was allotted for questions, comments, and recommendations from the participants on these and other subjects. The second-round topics included geography, data product plans, enumeration procedures, promotional activities, and the Tribal and Alaska Native Village Liaison Program.<sup>13</sup> Participation at the meetings averaged approximately 45 attendees.

Major recommendations and comments were generated from the discussion groups in the area of 1990 census content. Positions on some of these issues often varied, based on urban/rural and regional differences. As a result of the recommendations, the Bureau improved outreach efforts for this segment population and provided data for Alaska Native village statistical areas (ANVSA's)<sup>14</sup> in Alaska and census designated places (CDP's)<sup>15</sup> on Indian reservations; the census also recognized tribal jurisdiction statistical areas (TJSA's)<sup>16</sup> and tribal designated statistical areas (TDSA's)<sup>17</sup>.

<sup>13</sup>The Census Bureau asked each American Indian tribe and Alaska Native village to designate a representative from the tribe or village to serve as a primary contact with the Bureau on the 1990 census. This liaison acted as a direct line of communication between the tribes or villages and the Bureau for logistical and promotional assistance. (For more detailed discussions of this program, see chapter 5 ["Census Promotion Program"] and 6 ["Field Enumeration"].)

<sup>14</sup>A governmental unit, specified by an appropriate authority, recognized pursuant to the Alaska Native Claims Settlement Act of 1972. The villages did not have legal boundaries, but had specific geographic boundaries delineated for statistical purposes only, to facilitate the presentation of 1990 census data for the settled portion of each village.

<sup>15</sup>A CDP was a closely settled population center, located outside any incorporated place, with a locally recognized name but no legal limits or functioning government. The Bureau worked with State and local agencies to identify the names and boundaries for these places, and published census data for those CDP's that met the minimum population requirement. The minimum population for CDP's located on American Indian reservation was 250 and, in Alaska, 25. For more information on CDP's, see chapter 3, "Census Geography."

<sup>16</sup>A statistical area, identified and delineated by Oklahoma tribal officials, containing the American Indian population over which they had jurisdiction; a 1990 census tabulation area.

<sup>17</sup>Tribal designated statistical areas (TDSA's) were delineated outside Oklahoma by federally and State-recognized tribes without a land base or associated trust lands, for which the Bureau tabulated data. TDSA's represented areas generally containing the American Indian population over which federally recognized tribes had jurisdiction and areas in which State tribes provided benefits and services to their members. The names

## Committee on National Statistics' Panel on Decennial Methodology

Based in part on a 1982 recommendation from the American Statistical Association (ASA), the Bureau sponsored an independent technical advisory group to consider undercount assessment and related problems for the 1990 census. The National Research Council's Committee on National Statistics was asked to establish a panel to (1) suggest research and experiments, (2) recommend improved methods, and (3) guide the Bureau on technical problems in evaluating different methods regarding the conduct of the decennial census. The Panel on Decennial Census Methodology (made up of 15 statisticians and demographers with expertise on the subject matter) was created and given the task of investigating three major technical (as opposed to legal) issues:

1. Adjustment of census counts and characteristics, including exploration of formal criteria to evaluate measures of undercount and alternative adjustment procedures.
2. Use of sampling in the decennial census, specifically investigating whether sampling for coverage improvement and of nonrespondents for followup can improve accuracy at a given cost.
3. Use of administrative records, including investigating the possible uses of various types of records for improving the accuracy of census counts and the efficiency of census operations.

The panel had its first meeting in January 1984 and began examining the issues, as well as identifying additional topics for possible investigation. Its first undertaking was a thorough examination of uses of census data and the degree of accuracy needed to satisfy each use. An interim report in 1984 focused on recommendations for improvements in census methodology that needed early investigation and testing. Additionally, the report reviewed plans for the two-stage methodology planned for the 1985 test.<sup>18</sup>

In 1985, a "final" report updated and expanded the panel's ideas and conclusions about decennial census methodology. The report offered general and specific planning recommendations; among these were to—

1. Put high priority on the completion of studies of the undercount and overcount in the 1980 census
2. Examine the need for a mid-decade census by analyzing the effect of errors on the post-censal population estimates versus errors in the decennial census

of TDSA's delineated by State recognized tribes were followed by ("State") in the published census reports. The Bureau did not recognize TDSA's before the 1990 census.

<sup>18</sup>Committee on National Statistics, Panel on Decennial Census Methodology. *Planning the 1990 Census: Priorities for Research and Testing: Interim Report*. Washington, DC: National Academy Press, 1984.

3. Pursue a complete enumeration in 1990 as opposed to researching and testing a sample survey
4. Adjust the counts, but only if it would reduce differential coverage errors.<sup>19</sup>

Following the completion of these reports, the panel and Bureau staff continued to meet or correspond periodically through 1988 about current programs and plans. In 1988, the panel concluded its work with a report recommending priorities for the 1990 Census Research, Evaluation, and Experimental (REX) Program (see ch. 11). The report suggested which proposals should be fully funded and given the highest priority (grouped under two headings—coverage evaluation and content evaluation), which could be dropped, and additional projects to be added as priorities.

### Geographic Areas Conferences

Given the importance of geography in the decennial census, the Bureau believed, in looking back at the 1980 census, that internal resources and minimum outside consultation were not enough to develop the necessary procedures and criteria for identifying and delineating statistical areas. To make the census data for various geographic entities more useful, and to expand communication with Federal, State, and local levels of government as well as the business community and universities, the Bureau decided in 1979 to convene a conference of user experts. Their specific purposes were to review the Bureau's current geographic areas concepts, systems, criteria, standards, procedures, and programs, and to address the issues and problems relevant to decennial census geographic areas. Thus, a national conference was announced for the spring of 1984, to be followed by a series of three regional sessions that fall.

**National conference.** The National Geographic Areas Conference met in Reston, VA, from April 1-3, 1984, with some 40 invited persons from the academic, business, and data-user communities, and approximately 50 Bureau staff. Their three main objectives were to (1) identify the specific and pertinent issues concerning the definitions and delineations of geographic areas for census purposes, (2) recommend potential solutions to the problems in (1) above, and (3) evaluate and determine the most feasible ways of implementing these recommendations in 1990 census planning and program development.

The conference included plenary sessions with Bureau staff presentations designed to stimulate discussion and provide a basis for information-gathering and revisions of concepts (such as census blocks and the urban-versus-rural classification) and criteria. The sessions covered topics such as the definition, identification, and treatment of

different types of geographic areas. To develop recommendations, the participants were divided into four working groups made up of both outside participants and Bureau staff. The four groups discussed and presented recommendations on the following topics, respectively: (1) Census blocks, block numbering areas, and block groups; (2) census tracts; (3) urban and rural geography; and (4) census designated places (CDP's), census county divisions (CCD's), and other surrogates for legally defined areas. In summarizing their findings, the groups strongly endorsed a plan for nationwide block-numbering; delineation of census tracts or similar units for the 80 percent of the Nation's land area that did not yet have them (as a basis for tabulations by small geographic areas, consistent data at the census tract level and below; automation, to the extent possible, of the geographic definition of urbanized and non-urbanized population; and inclusion of input from State and local officials in setting guidelines for designating CDP's.

**Regional conferences.** After the national conference, the Bureau organized a series of regional conferences to expand the comment-gathering process on geographic areas to the local level, and to expose those officials to the recommendations developed at the national conference. The regional conferences were held in Oakland, CA, Houston, TX, and Washington, DC, during the fall of 1984. Along with reviewing and soliciting further recommendations on the priority issues raised at the national conference, participants sought to identify additional ones that needed consideration when planning the 1990 census. The organization of the regional conferences mirrored the national conference, with 40 to 60 invited persons from the local data-user community along with 10 to 25 Bureau staff (from headquarters and the regional offices). Bureau staff moderated four working groups and recorded minutes. Each group discussed the assigned geographic-area topics and presented the results in plenary sessions for additional discussion. The conferences were a valuable 1990 census planning tool. The findings varied widely from conceptual to operational and practical recommendations, such as (1) encouraging State and local involvement in the delineation of small-area geographic entities, (2) establishing census blocks for the entire Nation, and (3) suggesting greater diversity in the types of census data products available to data users.

### Other Meetings

**Joint meeting with minority groups.** With a major goal of improving census coverage of racial and ethnic minorities and serving minority data needs for the 1990 census, the Bureau organized a joint meeting of minority groups on January 8-10, 1984, in Chantilly, VA. Participants were 32 invited persons, 8 each representing the Black, Spanish/Hispanic, Asian and Pacific Islander, and AIAN communities (4 invitees were unable to attend) and 43 persons, either from the Census Bureau, the Deputy Secretary of

<sup>19</sup>Citro, Constance F., and Michael L. Cohen (eds.). *The Bicentennial Census: New Directions for Methodology in 1990*. Washington, DC: National Academy Press, 1985.



the Department of Commerce or other departmental officials, or congressional staff. The initial meeting focused on three major areas: (1) The Bureau's approach to 1990 planning, (2) the potential role of minority groups in the planning process, and (3) the objectives for the 1985 test census. Other purposes included encouraging the participation and enumeration of these groups, and informing them about the interpretation and application of the resultant statistics.

Bureau staff presented various 1990 census plans; findings from demographic analysis; profile comparisons of minority populations, such as statistical profiles of selected racial/ethnic groups; the experience from the 1980 census; outreach plans; and 1985 test programs. Following a question-and-answer period, all the participants were divided into six working groups and asked to make recommendations on outreach, recruiting for census workers, site selection for the 1985 test census, and potential effects of automation. Following this, the four racial/ethnic groups met in individual caucuses to discuss various subjects and recommendations. Many ideas and recommendations were traded throughout the meeting—whether in the plenary sessions, working groups, caucuses, or in informal exchanges. Suggestions included ideas for a successful outreach campaign, appropriate sites for the 1985 test census, strong endorsements for block-numbering the entire Nation, and the reestablishment of the three 1980 census minority advisory committees, as well as a fourth committee for the AIAN population. There also were concerns expressed that automation of the enumeration might replace necessary personal contact with the minority populations and that minority representation in the census workforce would need bolstering at all levels of recruiting.

**Planning conference on housing.** This conference in Hunt Valley, MD, from September 6-8, 1984, obtained recommendations for testing the housing questions to be used in the 1990 census. Over 40 participants represented government agencies, private businesses (mortgage bankers, homebuilders, utility and telephone companies), and academic and research institutions. Prior to convening, the Bureau developed a list of major issues for discussion, based on recommendations and comments from data users in the public and private sectors.

Suggestions relating to the modification of the 1980 census form covered replacing the question asking about "units at address" with "units in structure" as well as expanding the item to include the categories "mobile home with an addition" and "mobile home without an addition." Also, there were recommendations to move the question about complete plumbing facilities to the sample form, ask the value-of-property question of all owners, and add solar sources to the heating equipment and fuel questions.

Recommended new questions for testing were on whether housing was subsidized by the government and on the number and characteristics of housing units equipped for the aged, disabled, and handicapped populations. With the growth of the housing and mortgage financing industries,

participants wanted questions on the type of mortgage, original mortgage amount, purchase price, and insurance on homes. Also, they recommended adding questions on housing quality, such as heating-system breakdowns and the existence of holes in the floor.

To obtain more detailed information on living quarters, three categories of housing were recommended: Housing unit, specialized housing unit (elderly, handicapped, students, etc.), and group quarters. The conference suggested treating all housing units used on an occasional or recreational basis as units "not used as primary residence" instead of "seasonal."

There were individual recommendations to delete the 1980 census questions on number of stories in the building, existence of an elevator, and presence of a telephone in the living quarters.

**1990 Census Planning Conference on Race and Ethnic Items.** Another primary goal of the Census Bureau for the 1990 census was to improve the quality of racial and ethnic data. One step toward this goal was a conference in Arlington, VA, from July 14-16, 1985, to obtain ideas, advice, and recommendations on the racial, Spanish/Hispanic origin, ancestry, and parental birthplace questions for the 1986 National Content Test (NCT) (for more information on the NCT, see p. 36).

Thirty participants represented a broad spectrum of expertise from the academic, research, and ethnic communities. Following Bureau presentations on meeting objectives and discussion issues, conference members divided into six working groups to discuss and comment on the race and ethnic questions proposed for testing and other key issues identified by Bureau specialists, some of whom were assigned to each working group to act as resource persons and recorders. Following these discussion sessions, plenary sessions were devoted to the presentation of each group's results by the respective chairperson. On the last day of the conference, each working group was asked to comment on a set of the nine racial and ethnic questions proposed for the NCT.

They unanimously recommended testing several versions of the race question in the 1986 NCT. In contrast to 1980, when the word "race" was not used in the race question, it was suggested that the Bureau test and compare the results of including as well as excluding the term. Also, a suggestion was made to insert a "Mixed racial group" category.

With regard to the Spanish/Hispanic-origin question, suggestions were made to test several versions, including a modification of the 1980 question that would provide for write-in responses to the "Other Spanish/Hispanic" category.

In the 1980 census, a question on ancestry replaced the question on parental birthplace asked in the 1970 and previous censuses. The participants recommended reevaluating both the ancestry and parental-birthplace questions in the NCT.

To improve reporting, all six of the working groups unanimously recommended that the Bureau test alternative sequencing of the race, Spanish/Hispanic-origin, and ancestry questions in the NCT. Coinciding with this, they strongly urged modifying the format, wording, and instructions to make the intent of these questions clearer to respondents.

### Census Products Planning Meetings

A series of 10 regional meetings in the spring of 1986 sought public reaction to proposals for 1990 computer tapes, printed reports, microfiche, geographic products, and other dissemination media. In addition, data users around the country were asked to review a series of products "issues" relating primarily to 100-percent data and send their written comments on these issues directly to the Bureau. (The results summary that appears below includes general recommendations and written comments from the meetings.) Based in part on these recommendations, the Bureau refined its product proposals, developed and distributed a similar set of sample product issues, and convened a 2-day meeting with representatives of data-user organizations in the fall of 1986.

Organization of the spring meetings started with 25,000 meeting announcement brochures being printed. Each regional office was asked to distribute about 1,000 brochures to key people and organizations in its area. Copies also were sent to each State data center, with an additional supply for data centers in States in which a meeting was held. The regional offices were responsible for arranging meeting space and other logistics in Chicago, Detroit, Dallas, Denver, Los Angeles, New York, and Seattle; Census Bureau headquarters, for Washington, DC; and the Maine and Tennessee State data centers, respectively, for Portland and Knoxville. Attendance ranged from 29 people in Denver to 85 in Chicago and averaged 62 people per meeting.

Each meeting, designed to allow maximum user participation, lasted a full day. It began with a general session in which Bureau staff provided updated information on the status of plans for the 1990 census, outlined some of the major product issues, and described the purpose and functioning of the meeting. Following this, the participants could choose to attend any of three concurrent working groups—printed reports and microfiche, machine-readable products, and geographic products. Bureau staff moderated each session. The same sessions were repeated in the afternoon to permit participants to visit a second session. If time allowed, an additional topic of "user services" covered the Bureau's plans to help data users obtain and use the available data. Following the afternoon working groups, there was another plenary session, at which the group moderators or designated spokespersons summarized the consensus of each group on the major issues.

General comments and recommendations stemming from the meetings and the written submissions were that the Bureau should (1) issue, as early as possible, a list of

data products, their geographic and data content, and the planned media, to assist users in estimating budgets for necessary equipment and treatment of the data; (2) consider producing smaller, more focused reports rather than a few large compendia; (3) improve the quality and usability of the microfiche products; (4) review the size and organization of the summary tape files so that their structure will be more compatible and useful; (5) investigate the use of new media to distribute census data, such as compact disks and online computer systems; (6) design better reference materials and indexes of geographic areas and subject content; (7) investigate alternative disclosure avoidance techniques; and (8) provide a variety of information extracted from its TIGER system.

After reviewing these recommendations, and those from the local public meetings (see pp. 4-5) and the advisory committees (see p. 7), the Bureau revised its outline of data products, distributed an "issues" paper on sample data products, and invited representatives of 43 data-user organizations to a conference on census products held November 17-18, 1986, in Arlington, VA. Twenty-two of these organizations sent representatives, as did several of the Bureau's advisory committees. An introductory plenary session, in which Bureau staff outlined the status of census planning and reviewed product proposals, was followed by break-out sessions. From mid-morning through mid-afternoon, participants separated into preassigned working groups and dealt with machine-readable products, and printed reports and microfiche. A late afternoon general session focused on disclosure avoidance. On the morning of November 18, a Bureau staffer summarized the issues relating to geographic products, after which the working groups reconvened to address those issues. At the end, the groups reassembled into a plenary session to approve recommendations. Participants agreed on three general recommendations:

- The Bureau should concentrate on collecting, tabulating, and disseminating census data; special products and enhancements should remain secondary concerns.
- Given a choice between timely products and delayed release to allow the incorporation of updated definitions or concepts, data users generally preferred timeliness.
- Users urged the Bureau to prepare printed block maps for all areas, if necessary, by diverting resources from other geographic products.

**Special meeting on race and Spanish/Hispanic-origin items.** On January 27-28, 1987, approximately 40 participants gathered in Oxon Hill, MD, for a special meeting on race and Spanish/Hispanic-origin items. Invitees included members from each of the Bureau's four 1990 census minority advisory committees, as well as other individuals from the academic, research, and ethnic communities.

The purpose of the meeting was to assess the results of testing alternative versions of the race and Spanish/Hispanic-origin questions in the 1986 NCT and decennial test

censuses and to suggest improvements to these items for the 1987 test. Preliminary analysis of the results from the 1986 NCT and test censuses of central Los Angeles County, CA, and east central Mississippi indicated that refinements to the items were needed before their use in 1990. Further testing was planned, therefore, in a 1987 Special Urban Survey (see p. 44) and in focus-group interviews. At the meeting, participants offered advice for refinements of specific 1986 versions of these items and recommendations for testing in 1987.

**Census community meetings.** Based on historically difficult areas to enumerate, nine sites were selected and a series of community meetings were held between September and December 1986. These brought together local representatives of civic, community, and religious organizations; school representatives; and government officials to discuss with Census Bureau officials the plans for promoting participation in the 1990 census for these populations. The meetings were held in the following cities: Hartford, CT; Miami, FL; Philadelphia, PA; Detroit, MI; Atlanta, GA; New Orleans, LA; Oakland and Los Angeles, CA; and Houston, TX. Attendance at these meetings ranged from 13 in New Orleans to 74 in Los Angeles, and averaged about 40 persons. Bureau participation usually consisted of the director of the regional office covering the meeting area, as well as various decennial census branch chiefs and information and community specialists from headquarters.

At the meetings, discussions centered on promotional plans for increasing response and improving enumeration methodologies. The primary topics discussed were the use of local community organizations and leaders to identify hard-to-enumerate populations, promote the census to these populations, and recruit census workers; the use of a "census education package" for teachers, parents, and students; the "religious organization project" to get local clergy to explain the census; plans for mass-media outreach; a motivational insert as part of the questionnaire; and for enumerating the homeless and functionally illiterate populations.

The sessions lasted one day and began with Bureau staff presenting an overview of the goals for the 1990 census, initiating topical discussions by stating specific concerns and evoking comments, recommendations, and additional concerns in an open forum.

**Cities and the 1990 Census Planning Conferences.** Anticipating the difficulty it would face in collecting and tabulating information for over 105 million housing units and 250 million people, and completing this process in a timely and accurate manner, the Bureau decided to include local governments in the planning process. Therefore, it organized two 1990 census planning conferences for them.

From June 1-6, 1986, there were two conferences in Washington, DC, with representatives from 55 cities, the United States Conference of Mayors, the National League

of Cities, and the International City Management Association to discuss topics of mutual interest on the 1990 census. The first conference brought together officials from municipalities of 200,000 or more people; the second, representatives from places of fewer than 200,000.

Discussions focused on aspects of 1990 census geography (such as ensuring accurate information about corporate boundaries), recruiting (identifying labor pools), outreach (promoting of the census by local governments), and communications (keeping the local officials informed). Participants were given planning-status reports on each subject. Questions and issues were then introduced and discussed extensively.

Following is a summary of the recommendations from the discussions at both meetings, as well as from written suggestions provided after the conferences by representatives of more than 40 local jurisdictions. The following pertained to geography: (1) Municipal provision of corporate boundary information to the Bureau should be promoted because accurate boundaries would result in more accurate population counts for the governmental units. (2) The Bureau should ask local governments, on a voluntary basis, to furnish address information for the boundary locations as part of the annual Boundary and Annexation Survey.<sup>20</sup> (3) The Bureau should maintain its procedure of certifying municipal boundary changes with a State-level agency, but local governments should become more aware of their State's boundary certification process. (4) Where it is operationally feasible, the Bureau should request and make use of local geographic resources, but should provide adequate lead time and program explanations.

Recommendations on recruiting were as follows: (1) Make pay rates commensurate with the importance ascribed to the task of enumeration, and tie into State/local job training programs as a source of recruits. (2) The Bureau should develop national and market-segmented recruiting strategies with appropriate and "exciting" recruiting materials. (3) Local governments should emphasize the presence and importance of census jobs and incorporate these messages into their local census outreach campaigns.

Recommendations on outreach were as follows: (1) With the extensive use of census data by local governments, the Bureau should expect to involve municipalities in census outreach. (2) The idea of a Complete Count Committee Program should be broadened to the scope of a "Hands Across America" effort, with a national chairperson and national promotion. (3) The Bureau should develop creative messages for use during outreach and as motivators for local officials on subjects such as (a) the importance of census data and the uses of those data in State programs affecting local governments, and (b) response-rate/population-ranking contests between municipalities and

<sup>20</sup>For more information on the Boundary and Annexation Survey, see ch. 3.

municipal leaders. (4) Local governments should include articles and messages about the 1990 census in newsletters and billing statements, and help to establish questionnaire assistance centers.

Recommendations on communications included the following: (1) To foster the exchange of communications about the 1990 census within municipal governments and to expedite necessary actions by them, the Bureau should send copies of correspondence to more than just the office of the highest elected official. It should work with national associations to maintain municipal mailing lists, and recommend that local governments designate a liaison on census matters. (2) Through the temporary 1990 census district offices, the Bureau should brief local jurisdictions about census processes, timetables, the functions of the district office, and the nature of municipal-district office relations.

#### **Planning conference on the Census Education Project.**

For the 1980 census, the Bureau devoted an outreach program to the Nation's elementary and secondary schools. This project was aimed to increase awareness and understanding of the census among educators, students, and students' families. In the outreach plans for the 1990 census, the 1980 school project was acknowledged as an effort worthy of repeating. The objectives for 1990 were similar to those of 1980, except with a few added goals.

To assist in planning this second-generation activity, the Bureau sponsored a conference of teachers, school administrators, curriculum developers, State and national educational agency representatives, and other educators from July 23-25, 1985, in Columbia, MD. The intent of the conference was to identify target audiences, define the content and structure of teaching materials, gather advice and support on systems in the educational community, suggest project developers, and recommend methods to promote and disseminate program materials.

Designed for consultation and exchange of information, the first half of the conference was an informative session, while the second half was devoted to generating ideas and recommendations from the invited educator participants through five small working groups. Results were presented in subsequent plenary sessions.

The conference began with a review of the 1970, 1980, and 1985 test experiences and evaluations. Following the explanation of the conference format and structure, discussion of the major tasks took place in working group discussions on the topics of the basic and enhanced packages, and the latter's development and implementation.

Recommendations, as reported by the five working groups, were the following: (1) Create a 1990 school package aimed at the Nation's elementary and secondary schools. (2) The package should be an effective educational and awareness tool and the school project should be ongoing. (3) Use an interdisciplinary approach in elementary schools. (4) Design the secondary schools' materials to be subject-specific with emphasis on social studies and

mathematics and, to maximize student exposure, including a variety of school activities in the secondary program that could fit into many subject areas. (5) Produce materials that are national in focus but sensitive to geography, race, and ethnicity. (6) Include reproducible lessons and activities in the 1990 package. (7) Include a variety of school-wide activities that relate to general outreach programs in the 1990 emphasis package. (8) Add the following enhancements as complements to the 1990 package: Videotapes and films; paper visual products, especially maps; micro-computer software and related products; teacher resource assistance; and education-related product listing. (9) Solicit endorsements from the National Council of State School Officials, National Association of School Administrators, American Federation of Teachers, and National Education Association.

**Planning conference on outreach.** In keeping with the Bureau's objective of soliciting suggestions and recommendations from the public on the 1990 census, a conference on census outreach was organized and a group of outside individuals were invited to discuss and examine a series of outreach issues that might be anticipated for 1990. The participants were to examine the Bureau's 1980 outreach and the problems encountered, explore possible ways to avoid the same problems with the 1990 program, and suggest ways to foster mutual understanding between the affected population and Bureau staff. The conference convened from September 24-26, 1984, in Frederick, MD, a site that met the criteria established by the Bureau—namely, to avoid distractions, be economical, and possess adequate support services. Given budget constraints, the conference was limited to approximately 30 outside participants. These included media, religious, and community-based organizations, academicians, and congressional and union advocacy groups. Selection of participants was based on a number of factors, including geographic and minority balance, refugee status, youth, the handicapped, aging, and so forth.

The conference was structured to promote open discussions between outside participants and census officials and managers. The first evening consisted of meeting and getting to know the participants and having the Bureau director present the program's goals. These goals included encouraging mail response, improving the differential undercount of minorities (the undercount was smaller in 1980 than 1970), and developing a good atmosphere within which to take a census—people must be convinced that it is important and safe. The second day of the conference began with a plenary session that offered an overview and the objectives of the meeting, provided background on the 1980 promotion program, and outlined the 1990 planning process. This was followed by an overview of the 1990 preliminary outreach plan and short presentations by Bureau staff members on census community awareness. The participants were then divided into 6 working groups of 12 participants each; all were given identical questions on census awareness and asked to reach a consensus on the

best approach for the issues presented. A plenary session following the first group session allowed all conference participants to hear the reports of each group and discuss further recommendations and suggestions on issues of community awareness. A presentation on promotion and publicity followed; different working groups developed recommendations and suggestions on this topic and reported in a plenary session the final morning. The final day was highlighted by a talk from former Bureau director Vincent Barabba, who emphasized that the problems of 1990 would not be like those of 1980; the objective was to have a 1990 census as much improved over 1980 as 1980 was over 1970.

## Other Contacts

**Housing Statistics Users Group (HSUG).** Representatives from organizations with an interest in housing statistics organized this group during the fall of 1985. With the absence of a standing census advisory committee on housing, this group intended to establish a dialogue with the Bureau on decennial census and survey housing data. A main concern was providing input for improving data and optimizing question structure in the 1990 census. The HSUG was made up of 11 housing-related organizations, as follows:

- American Federation of Labor—  
Congress of Industrial Organizations (AFL-CIO)
- American Planning Association
- Council of State Housing Agencies
- Housing Assistance Council
- Mortgage Bankers Association
- National Association of Home Builders
- National Association of Housing and Redevelopment  
Officials
- National Association of Realtors
- National Council of Savings Institutions
- National League of Cities
- Urban Institute

Various meetings were held with this group during the planning period for the census. In the initial meeting in the fall of 1985, the HSUG presented the results of a member's analysis on the measurement of inadequate housing that identified two or three key indicators of housing quality. Following this, the group recommended including additional 1990 census questions pertaining to the quality of housing, such as the frequency of breakdown in heating equipment and the existence of holes in the floor. In subsequent meetings, the group recommended including in the census, as a separate amount, the homeowner's payments for second mortgage and home equity loans. Further, recommendations were made for two supplemental surveys (Components of Inventory Change and Residential Finance) as part of the 1990 census program. The HSUG worked with OMB and Congress to try to ensure that those surveys would be continued and appropriately funded.

**Correspondence from the public.** During the interim years leading up to the 1990 census, the Bureau received frequent correspondence, mostly in the form of letters, from individuals, organizations, foundations, city and State officials, businesses, and congressional offices. Content specialists reviewed, considered the recommendations, and prepared a response. The major topics of concern addressed were the need for data on disability (such as identifying its type), ancestry, parental birthplace, and pet ownership; requests also were made on topics such as gun ownership and cigarette smoking.

Selected requests received from individuals for the collection of detailed data were included in census tests before the Bureau decided on the content of the 1990 census questionnaire. For example, several versions of disability questions were tested to determine the feasibility of collecting this information.

Some correspondents asked that questions on both ancestry and birthplace of parents be included in the 1990 census. There was a parental birthplace question in the 1970 census, but not in 1980. The 1986 National Content Test reevaluated the ancestry and parental birthplace questions (see p. 36; for more information see ch. 14.)

With regard to questions on pet ownership, the Bureau replied that a "pets" items would not be added to the questionnaire because it would not meet the data criteria necessary to fulfill legislative and programmatic requirements and/or meet a broad social need.

**Population Association of America.** With approximately 3,000 professional demographers as members, the Population Association of America (PAA) had much interest in the content and data collected from the decennial census. In April 1985, the PAA formed a subcommittee to survey membership opinion on issues regarding the 1990 census. Following the mailing of questionnaires in late November 1985 to a 10-percent sample of members, the responses were tabulated and submitted to the Bureau in January 1986. Results of the survey indicated that, overall, PAA members were satisfied with the census content. However, recommendations for reinstating the parental birthplace question and improving and clarifying the wording of the race and Spanish/Hispanic-origin questions were mentioned.

## CENSUS PLANNING CONFERENCES AND COMMITTEES

### Planning Conferences

Aside from its ongoing external consultation and contacts with data users described above, the Bureau began its planning process for 1990 in mid-1982 with the organization of the first (of four) essentially internal, offsite planning conferences. The gatherings examined experiences of the 1980 census and explored the likely issues requiring resolution before 1990. The conferences ranged in subject matter from defining exactly what "enumeration" meant for the 1990 census to making the final decisions on

the overall census strategy. Offsite, the Bureau hoped to create a better working atmosphere away from the distractions of the headquarters complex. The conferences involved gathering key Bureau staff for the 1990 census, together with several invited participants from the outside data-user community.

**Conference on the meaning of enumeration.** Consistent with its planning traditions, the Bureau spent much time examining new proposals for maximum efficiency for upcoming censuses. However, over the last two decades, the issues and proposals seemed to grow beyond the general census activities implied in the Constitution as understood by the agency. It soon became apparent, as the uses of census data proliferated rapidly during the decade of the 1970's and following the 1980 census, that there might be a tendency to doubt the forthcoming 1990 data's accuracy and coverage. As the court cases of the previous decade were tried, it also became evident that there were many conflicting ideas about what enumeration was, or should be, in the minds of the litigants, the judiciary, the Congress, and other decision makers. Depending on how it was interpreted legislatively or administratively, enumeration could mean (1) directly contacting everyone counted, (2) accepting indirect evidence of people's existence, or (3) estimating the number of persons. This continuum led the Bureau to set defining "enumeration" as a major objective for the 1990 census. So, from July 27-31, 1982, in Chantilly, VA, staff met with 20 invitees from city and State governments, Federal agencies, academia, private industry, and foreign countries to focus on the definition. This was the first major conference in preparation for the 1990 count.

Prior to the meeting, participants were asked to select and defend one of four proposed alternatives: Should the census be (1) a complete count, (2) a complete count with sample followup of nonrespondents, (3) a conventional enumeration, subject to adjustment where necessary from Federal, State, and local administrative records, or (4) a traditional count augmented by the use of statistical theory and methodology to obtain the most cost-efficient, accurate results for the Nation as a whole and for subgroups of the population? (This conference procedure, called "strategic assumption surfacing and testing," had been used in planning the 1970 and 1980 censuses.)

Since the focus was to identify support for attendees' various points of view rather than reach a conclusive answer on the meaning of enumeration, a number of relevant issues emerged that would be used so more specific planning could proceed over the next 7 1/2 years. Concerns centered on cost, legality, adequacy of suggested methods, the use of lists, public perception, data user needs, accuracy of data for small geographic areas, and timeliness of data availability. There was general agreement that reduction of costs was an almost imperative goal. Many conferees believed that a cost-efficient census could be achieved with improved techniques, efficiency in processing, and automation of labor-intensive

activities without altering the goal of enumerating every person. However, some participants disagreed, believing that cost was not a major issue; the census was an important government responsibility and the necessary funds would be forthcoming.

There was discussion about the possibility of apportioning the House of Representatives based on a sample population count. Article I, Section 2, of the U.S. Constitution calls for a full census for this purpose, and anything short of this would require a change in existing laws, including Title 13 of the United States Code, the statute governing the Census Bureau's operations. There were many conflicting views about the advisability and strategy of asking Congress to remove the restriction on the use of sampling for data collected for reapportionment purposes. Noting the usual length of time required by the legislative process for major changes to existing laws, some attendees suggested that Congress should be asked to change the law even before all the evidence was in from research as to whether sampling would be appropriate. There was much debate about the issue of sampling in the 1990 decennial census. There was strong individual insistence that either (1) the traditional approaches to census-taking were sufficient in meeting cost and time constraints or (2) sampling could produce accurate numbers, even for very small areas, without the necessity for a nationwide headcount. Some consideration was given to the idea of a combination of both methods, possibly headcounts in small governmental units while using sampling or estimation techniques in larger ones.

Convincing assertions were made about the validity of sampling and estimation techniques as well as the efficiency of the use of lists (from State or local government administrative records) as an effective tool for census taking, but counter-arguments pointed out that there was little information available to back up the claims, such as how much these approaches would cost, how accurate they would be for large and small areas, and whether the method would be timely. Also, concerns about the use of lists were raised regarding the correct allocation of persons, as well as the possible negative perception of government data-sharing and computerized population lists.

Conference facilitators grouped these and many other arguments into four major issues: The use of State and local administrative lists, technical issues relating to estimation, data-user participation (perception, satisfied needs), and political and legislative considerations. The original group members were reorganized into four new groups around these issues. Each group developed synthesis statements incorporating its findings and presented them in a plenary session. Major recommendations included a research program on the availability and uses of various administrative lists, public discussion of the goals of the census, discussions with congressional committees to keep their members and staff apprised of new developments in 1990 census planning, proposing a change to Title 13 of the U.S. Code to permit sampling in connection



with the decennial census, research and testing of measurement of the undercount, and meetings or conferences with all segments of the data-user community on 1990 census issues. The findings were intended to help perfect issues and options on which more specific planning should proceed.

The last activity prior to adjournment was a plenary session to develop “new census ideas” through a series of brainstorming sessions. The ideas were not to be constrained by perceived feasibility or reasonableness. For example, it was suggested that the Bureau should announce the cancellation of the census and then monitor the public reaction. Another suggestion was to develop computer models to simulate effects of alternative methods on cost and error. The brainstorming sessions were not restrained by formal analysis and assessment, so many of the ideas did not relate to the assumptions or ways to gather the information necessary to resolve the uncertainties about the issues debated. However, the Bureau examined all the issues closely in preparation for the 1990 census. As a foundation from which the agency used to help formulate its plans for 1990, the conference was successful in identifying and summarizing many complex issues involved in defining enumeration of the population and determining how that enumeration could be accomplished. It still was the Bureau’s responsibility to deal with the uncertainties of the assumptions and find solutions to the problems.

**1990 planning review conferences.** The Census Bureau organized two offsite meetings where key Bureau managers, supervisors, and staff members focused on overall 1990 census planning. The conferences had many important purposes, including exchanging information among the many persons playing major roles in the 1990 census, aiding in the implementation of the programs that culminated in 1990, building a communication and support system to serve the Bureau throughout the decade, and fostering a spirit of collegiality. Prior to the meetings, all employees with 1980 decennial census experience received a questionnaire on census planning, asking them to evaluate the 1980 census and make suggestions for 1990. The results of this survey were discussed at the first conference.

The first of these planning conferences was held April 18-20, 1983, in Towson, MD. Being the first of the internal offsite meetings centered on overall 1990 census planning, there was an emphasis on developing cooperation, understanding, and trust among the persons and divisions involved. With the idea of information exchange, the 55 attendees (from 13 divisions and the executive staff) were encouraged to make suggestions for the various programs and policies being considered for 1990 and provide continuous feedback during the conference. The focus on staff communication channels was to elicit methods for improving the existing system of periodic meetings and memorandum series.

Issues discussed at the first conference evolved primarily around the significant task in census planning of choosing the major decision dates for the operational portions of the census. The initial time schedules had to begin with planning the test census activities and continue through issuing the data products. Some of the key dates the conference participants were working toward included the September 1985 deadline for reaching a decision on the basic 1990 enumeration plan. Also, by that date, the basic adjustment, sampling, administrative records use, and residency concepts had to be confirmed. By September 1986, the automation approach for basic data collection and processing office configuration had to be resolved. The summer of 1987 brought the deadline for the questionnaire’s basic design and the method for tallying the data. By early 1988, the Bureau had to identify all the questions and their exact wording.

The second conference, June 11-13, 1984, in Fredericksburg, VA, focused on reviewing and updating the information about decennial census planning since the April meeting. Sixty-four staff members (from 15 divisions) and two Commerce Department representatives attended.

Issues here related to automated systems, new methods for creating and updating mailing lists, product design and data dissemination, and the production of digitized maps in cooperation with the U.S. Geological Survey (see ch. 3). As part of its commitment to contain the census cost per housing unit at the 1980 level (allowing for inflation), the Bureau planned to allocate a larger proportion of its funds to research on cost-efficient automation. It was felt that increasing automation would reduce the cost of processing and geographic activities. Thus, at this conference, the staff discussed how automation might optimize coordination and produce more accurate and timely data, limit equipment costs, maintain secure control of census confidentiality, produce a computerized address-control file,<sup>21</sup> and support such varied programs as census geography, communications, management information, and payrolling.

During these meetings, Bureau personnel had a team-building exercise and made presentations on topics ranging from test census planning, and decision dates, to current decennial activities, budget estimation, automation programs, questionnaire content, and collection methodology. Format remained consistent throughout both conferences, with attendees being divided into small working groups made up of members from different divisions to help improve working relationships and evoke innovative thinking and solutions. The working groups convened for periods of 30 to 45 minutes, and group reports were presented in subsequent plenary sessions.

The conference deliberations about the accuracy and efficiency of the census count led to the organizing of two

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<sup>21</sup>A series of programs and files used to track the progress of major census operations by using geographic codes unique to each living quarters, an associated identification number, and other identifying information for all living quarters.

new decennial entities for 1990, the Decennial Planning Division (DPLD) and the Decennial Operations Divisions (DOD).

**Decennial census decision conferences (DCDC's).** Two decision conferences in 1985-86 were critical in the systematic planning process for the 1990 census. The DCDC's were held in Williamsburg, VA, October 14-18, 1985, and April 28-29, 1986, in Lanham, MD. Their focus was more than just information sharing: decisions had to be made on crucial issues and action plans. The participants (94 Bureau staff members and 10 others) included the executive staff, managers and supervisors of divisions with decennial responsibility, regional office directors, and other staff with significant knowledge or responsibilities. Others were outside consultants and observers from Canada, Sweden, Mexico, and the House Post Office and Civil Service Committee's Subcommittee on Census and Population (the Bureau's oversight committee). It was hoped that the meetings would provide immediate feedback on issues, enhance "team" camaraderie, and increase the chances of success.

The conferences were to make key decisions on the 1990 office structure (regional, processing, and district offices), outreach and promotion strategies, operational and scheduling approaches toward possible adjustment of the census results, sample-data collection methodology, and questionnaire organization. The conference objectives the Bureau hoped to achieve were to (1) have a full and fair discussion of the issues, (2) reach the best decision possible with the available information, (3) achieve acceptance and understanding of a decision if there was no agreement on an issue, and (4) document the decision.

Before the first conference, participants were given issue papers to familiarize themselves with the important assumptions, criteria, and options and specific questions for discussion. After convening, Bureau staff members made presentations on relevant topics for discussion during plenary sessions. Then the participants broke into arbitrarily assigned working groups; each was assigned a specific topic (e.g., management, field operational requirements, stakeholder perception, staffing, processing, or computer/technical support) and asked to develop criteria for evaluating it. Following the working group sessions, the group leaders presented their results in a plenary session. The Bureau's executive staff and some decennial division chiefs met privately in the evenings to evaluate options and attempt decisions. Private contractors with expertise in decision-making facilitated these sessions. The plenary session summarized the rankings and discussed each option's overall risks and opportunities for excellence.

The consensus reached on the topic issues were as follows:

1. With regard to regional, processing, and district office (RO, PO, DO) structure, large processing offices would handle mail-return questionnaires from district offices located in large metropolitan areas,

while other district offices, located in suburban and rural areas, would receive, edit, and follow up their own questionnaires by telephone before sending them to the processing offices. The number of large host processing offices might range from 4 to 18. All mail-returned questionnaires from metropolitan areas would go to the large host, which would check in questionnaires and capture data. Followup work would be sent to the DO's for repair. In non-metropolitan areas, mail return questionnaires would go to a master district office. The conferees believed that this office configuration best met the Bureau's established criteria<sup>22</sup> for that decision and offered the best opportunity to achieve 1990 census goals.

The decision also included a plan to process the 1990 census questionnaires on a concurrent basis during the data-collection phase. This new plan was in sharp contrast to the sequential processing of the 1980 census questionnaires, which were not converted to computer readable forms until after the basic field work was completed. The Decennial Planning and Decennial Operations Divisions would coordinate development of these plans.

2. With regard to outreach, the conference concluded that the Bureau would not have a sweepstakes as part of the 1990 census. There was considerable discussion about the public perception of a sweepstakes; it might be perceived negatively as gambling or as a poor use of Federal funds. There were also implications that it could make the decennial census appear trivial. Although it might create good publicity opportunities and increase enthusiasm and incentive for respondents to complete and mail in questionnaires, some respondents might try to obtain and mail in several questionnaires, increasing workloads and decreasing accuracy.

It was proposed that the Bureau should pursue the development of a mascot for the census through the Advertising Council's designated agency. The Bureau did have a logo, rather than a mascot; however, the logo proposed during this conference was not the one used during the 1990 census. The 1990 Census Promotion Office (CPO) designed another logo in 1988, and it became official (see fig. 1).

<sup>22</sup>Among these were: (1) the capacity to assure the confidentiality of census data; (2) the availability of a qualified labor force; (3) the flexibility to identify and react to operational modification of plans; (4) the ability to simplify the flow of paper; (5) the capacity to ensure timely and effective movement of information and materials between district and processing offices; (6) the ability to support adjustment; (7) the ability to provide clear lines of responsibility and authority; (8) the capacity to test critical elements of the system; (9) the availability of adequate space; and (10) the ability to recover from catastrophic events. For a complete list of the criteria, and a thorough discussion of the alternative processing office configurations considered for 1990, see Bureau of the Census, *1990 Planning Conference Series No. 14: Decennial Census Decision Conference, October 1985*. Washington, DC: Government Printing Office, 1985.

Figure 1. 1990 Census Logo

CENSUS '90



3. In deciding on the Bureau's operational and scheduling approach toward possible adjustment, there was agreement among the conferees that a schedule timed to meet a late-December 1990 deadline on the adjustment decision would be extremely demanding. To complete this task, the following actions had to be taken: (1) In trying to meet the dual objectives of a complete enumeration of the population and a timely measurement of the completeness of the count, the Bureau would have to consider having Census Day earlier, e.g., February 1, 1990. (2) Research and testing of a pre- and post-enumeration survey would have to be ongoing. In light of these discussions, Census Day remained April 1, 1990, but the date for the adjustment decision was pushed forward to July 15, 1991. Another suggestion proposed at the conference was a "super census." It involved an intensive, "error-free" enumeration in a sample of blocks and a regular census in remaining blocks. The weighted results of each enumeration would be compared and, if the super-census method showed significantly better results, these results would be used to adjust the data for the blocks enumerated by the regular census procedures.

Sample-data collection methodology and the specific use of a structured questionnaire were not covered at the conference because the time was needed to finalize the 1990 office structure.

During the second DCDC the following year, Bureau executive staff, decennial division chiefs, and other staff met to assess the costs, risks, and benefits of options in the 1990 planning scenario, and to develop modifications or alternatives if needed. The conference participants agreed on a list of guidelines and specific design features based on these guidelines. According to the DCDC framework, it was decided at this conference that the 1990 processing system would include 10 to 14 "high-tech" processing offices that would use a consistent data-conversion technique, FOSDIC (film optical sensing device for input to computers),<sup>23</sup> for the States and the District of Columbia, but not elsewhere. Write-in information from sample forms

<sup>23</sup>Hardware that converted data on microfilm to machine-readable forms on magnetic tape.

would be keyed for automated coding and help speed the production of sample-data products. The conference decided upon three types of district offices (DO's), each associated with a different workflow pattern:

1. Centralized DO's, primarily serving large cities (particularly the areas where it would be difficult to enumerate the population and recruit staff). For these, most automated and clerical activities (questionnaire check-in, microfilming, FOSDIC, automated/clerical edit, telephone followup) would be centralized in the processing offices. This would allow the DO's to concentrate on field data collection problems, such as nonresponse, and on failed-edit followup.
2. Decentralized DO's, serving most of the remaining mailout/mailback areas. Similar to the 1980 DO structure, staff in these offices would receive mail returns directly, edit the forms, and do field and telephone followup. These DO's would send check-in status reports to the processing offices via computers for official check-in against the address control file, and forms would flow to the processing office for microfilming and FOSDIC as they passed edit or were returned from failed-edit followup.
3. Combination DO's, using both mail and data collection without mail. There would be a decentralized workflow for the mail-return portion; questionnaires for the nonmail portion would be completed by the conventional door-to-door enumeration, checked in, completed and edited by clerks, and transmitted by mail to the processing office for microfilming and FOSDIC capture. All district office types would use the automated system to support administration and to control collection activities. See chapter 6 for the offices' final structure.

**Automation planning conference.** Two meetings were convened in late 1983 and mid-1984 of Bureau managers, supervisors, and technicians who were planning to work on research activities, programs, and operations related to the 1990 census. The purposes were to explore and develop applicable automation methodologies and techniques. The first conference, in Frederick, MD, on November 14-16, 1983, brought together staff to share information and develop an understanding of the major automation objectives and challenges, and to help prepare a comprehensive plan for automating the administrative, geographic, data collection, data capture and processing, and publication processes.

There were presentations about the work completed by an internal committee on automation (see p. 20), the automated data processing (ADP) acquisition process, state-of-the-art technology, automated coding, computer-assisted telephone interviewing (CATI), automated geographic systems, and a prototype plan for automating census collection, data capture, and processing operations. Conference time was distributed evenly between

plenary sessions and small working groups composed of 7 to 10 individuals, divided between technical and nontechnical staff. These groups commented and advised on recommendations presented.

The working groups addressed the needs to—

- Assure an effective and efficient computer-equipment procurement process.
- Develop a long-range plan to serve future Bureau needs and to experiment with hardware and software technologies.
- Implement the computer-assisted telephone interviewing (CATI) systems for use in ongoing Bureau surveys. This would indirectly provide information and experience adaptable to census operations.
- Simulate, through automated coding of the industry and occupation responses, the clerical processes that recognize occupations, meaningful words, misspelling, synonyms, and abbreviations.
- Use the automated geographic support system's TIGER<sup>24</sup> file, an address control file, and a data capture file. This system was to be highly automated, in order to produce consistently flexible and timely geographic products.

The goals of automation in the 1990 census required meeting all legal mandates, keeping census costs reasonable, publishing data products on a timelier basis than for 1980, improving the level of accuracy and coverage of census operations, balancing the length of the questionnaire with data needs of the community, and maintaining confidentiality of individual census responses.

Building on these goals, the Bureau organized a second automation planning conference, held July 23-24, 1984, in Hunt Valley, MD. This brought together experts from private firms, academic institutions, and other Federal agencies, as well as Bureau staff members, to discuss current automation methodologies and techniques proposed for the 1990 decennial census.

At the first day of the conference, members of the executive staff explained the meaning of automation for the census: The eight major areas in which the agency was seeking increased automation were geographic systems, the address control file, data capture, cost and progress reports, questionnaire editing, telephone interviewing, automated coding, and tabulation and publication. The systems-design criteria were stated as being—easy to operate, thoroughly tested and proven capable of handling census operations, reasonable cost for equipment and computer

resources, and containing safeguards to maintain confidentiality. A systems expert from the private sector then described a proposed framework for designing the system architecture for the 1990 census. The remainder of the day was devoted to discussing methods for converting census data into computer-readable formats such as optical mark scanning, microfilming, and keying.

The second day began with the topics of communications and networking of microcomputers as they might apply to census processing. Issues such as secured transfer of data and the use of nationwide communication networks and local-area networks were discussed. Two working groups presented reports based on session-related questions submitted by Bureau managers.

Following this, information-capture topics were covered, including the use and design of handheld interviewing devices, CATI, questionnaire design and its impact on respondents and data processing, and the application of artificial intelligence for coding questionnaire write-in entries such as occupation and place of work. The final topic on the agenda for the second day was geographic support, including the production of over 300,000 maps to be used by enumerators to find and geographically code living quarters for tabulation into specific areas. Two speakers described emerging technologies for cartographic and video-disk applications for map storage and retrieval.

The morning of the last day was devoted to information-processing systems for tabulating very large-scale survey data, data-base management systems for storing and retrieving census statistics, and data management using screen-composed forms. Two working groups presented related reports. In the afternoon, a Bureau-led panel discussed strategies for automating the census. The conference closed with a critique of its own processes.

## Planning Committees

Following the final stages of the 1980 census, the Bureau began assessing it and planning for 1990. A series of internal committees, composed of staff members representing a wide range of functional areas, conducted these reviews. The participants were chosen based on experience and particular knowledge of the subject. Committee composition varied widely, depending on the topic, with an average of 27 members. Some full committees formed subcommittees on separate topics to aid in research and evaluation; the subcommittees drew membership from the full committee and additional staff having knowledge or skills that could be valuable to the group.

Members reviewed past procedures, goals, and methodology, and proposed new or modified plans and methodologies and new areas of research, with the goal of coverage improvement and cost efficiency. Also, the committees were vehicles for communication and research among divisions. Generally, each committee met regularly over approximately 2 years, until it issued its final report, to be used by census coordinating committees (see p. 25) as the bases for final plans later in the decade. The following is a summary of the committees' assignments:

<sup>24</sup>The Topologically Integrated Geographic Encoding and Referencing (TIGER) System was a fully automated geographic support system, with a digital geographic file covering the entire United States, Puerto Rico, and the outlying territories. The file records represented roads, streets, and other map features of significance to the Bureau for data collection, and the geographic entities and legal/statistical boundaries to be recognized for census data collection and tabulation. (For more information, see ch. 3.)

**Inventory of 1980 evaluations.** There were 291 evaluation studies in conjunction with the 1980 census, covering the 1980 census as well as the 1980 tests and dress rehearsals. This committee, formed in mid-1982, prepared summaries of study conclusions and major findings in a format more user-friendly than a complete report. The final report was produced a year later.

**Inventory of suggestions.** Following close after the completion of the 1980 census, an Inventory of Suggestions Planning Committee was formed to compile an inventory of all suggestions for improving the 1990 census and to organize them into a usable document for all levels of management.

To meet its objectives, the committee used various sources to identify suggestions. The first steps included identifying and reviewing a source, followed by documenting any suggestions found, classifying them by topic and subtopic, and checking to eliminate duplication. Then they were summarized and rated as either a primary or secondary priority (based on the knowledge of the committee members and that of some people outside the committee). The topics under which the suggestions were filed were planning and coordination, coverage improvement, the questionnaire, processing, administrative (field offices and general), data dissemination and reliability, geography, office operations and field procedures, and outlying areas enumeration.

**Automation.** With the emphasis on automating the 1990 census and the logistics involved with this type of implementation, automation planning had to begin rather early in the census cycle. It started in the latter part of 1982, when the Bureau set goals of increasing automation with the purpose of accelerating the 1990 data products output, and automating the data capture to help accommodate nondecennial census data uses such as age search,<sup>25</sup> sample redesign, etc. The most efficient and cost-effective computer hardware (including FOSDIC and robotics) had to be available for various operations, such as handling administrative records, map plotting and reading, etc. There also were concerns regarding the new plans for automation: Security had to be built into software packages in order to maintain the confidentiality of data collected, even against other government agencies; good promotional and contingency plans were needed to ensure public confidence and continuing operations in case of equipment failure.

An Automation Committee was organized during January 1983 for the purpose of explaining potential benefits of

<sup>25</sup>A Bureau service offered to the public (only an individual or his/her legal representative was entitled to receive the information) for a fee, in which the staff searches the confidential records from the population censuses and issues official transcripts of the results. These transcripts contain information on a person's age, sex, race, State or country of birth, and relationship to the householder, as evidence to qualify for Social Security and other retirement benefits, in making passport applications, to prove relationship in settling estates, etc., or to satisfy other situations where a birth or other certificate was needed but not available.

increased automation of the 1990 census processes and identifying areas in census operations that should be considered for automation.

Following initial organizational meetings of the full committee, four subcommittees were formed to study the major census functional areas: administrative, developmental, data collection, and data capture and processing. The committee concluded its research by late 1983 with a documented report listing the automation goals, an inventory of 1990 census processes by functional area, a description of the functional requirements for each of the 1990 census processes in terms of input and output requirements for a particular operation, and other outstanding issues that might affect process automation, such as confidentiality obstacles, service contracting, staffing, equipment compatibility, evaluation programs, and backup systems.

The final detailed automation decisions and hardware specifications are outlined in chapters 7 and 8.

**Enumeration.** A Field Operations Planning Committee was established in March 1983 to review field operations issues and 1990 administrative and personnel requirements, including space, equipment and supplies, training, staffing, communications, and management information needs. To facilitate their research, the participants were divided into four subcommittees to address each topic. They concluded their research in October 1984 with a formal report presenting recommendations in the areas of information management, equipment and supplies, staffing, training, pay/personnel, and reference (procedures and training) materials.

**Geographic operations.** In February 1982, the Bureau formed a Geographic Operations Task Force to review current geographic support activities and make recommendations regarding implementation of efficient and effective methodologies for the future. The goals of the group were accomplished the following year with the production of a final report detailing assessments of the major geographic products prepared for the 1980 census and recommendations for alternative methods and/or improvements in the current geographic operations to be implemented for the 1990 census. A primary consideration in developing their recommendations was the timing necessary to provide geographic products in relation to the expected requirements of the 1990 census. A principal recommendation of the group was that the 1990 geographic information, such as maps and geographic codes, must be automated and integrated into a single system. This was the basis for the TIGER System.

**Geography.** Following the production of the final task force report (see above), the Bureau formed a 1990 Geographic Planning Committee to assess the 1980 census strategy and current research and assessments, and begin developing recommendations for a geographic support system for 1990. The committee reached its goals by identifying

significant 1980 census geographic problems and recommending possible approaches for their resolution for 1990. Among the final recommendations, and consistent with the task force findings, was the need for a single geographic data base that would produce the three major geographic components required to take a census: a variety of maps, address-coding capability, and a geographic reference file—all of which were handled separately and, therefore, inconsistently during the 1980 census. The resulting single data base (TIGER System—see p. 41 and ch. 3) could produce these critical tools without inconsistencies and on a timely basis. In case it could not be entirely implemented for the entire country in time for the 1990 census, the automated system would have a backup.

**Outreach.** A planning committee on outreach was formed in 1983 to evaluate the 1980 census outreach campaign and submit a preliminary plan for 1990, including publicity and contact with community and minority groups. The group concluded its research in November 1983 with a final report issues in the 1990 informational memorandum series. The report offered recommendations relating to public service advertising, local public meetings, Federal Agency Council meetings, Public Law 94-171, minority advisory committees, and census community outreach programs.

**Coverage improvement.** The Bureau formed a planning committee in the fall of 1983 to review past coverage-improvement procedures and goals and to recommend areas of new research in light of current census objectives and developments. In contrast to other planning committees, this group worked through the entire census cycle, not only on coverage-improvement proposals, but also by assisting in implementing and evaluating these proposals through the test censuses.

The committee identified potential coverage errors attributed to census operations in 1980, as well as proposals not carried out. Key considerations were the automation plan, as well as the testing of new enumeration techniques, included update list/leave,<sup>26</sup> a two-stage census,<sup>27</sup> an automated address control file, and modified enumeration plans for American Indian reservations. (See Test Census and Dress Rehearsal section beginning on p. 27 for more information.)

**Postal Service issues.** The Bureau formed a 1990 Postal Planning Committee in 1983 to address issues relating to the various ways in which the U.S. Postal Service (USPS) might participate in the 1990 census. The committee

attempted to limit its research to identifying only USPS-related issues. Among the final considerations, issued in a November 1984 report, were details on mailing package designs and specifications, address list development and improvement, and the formation of a Bureau of the Census/United States Postal Service Task Force for exploring detailed areas of USPS involvement in the 1990 census. Other issues identified included USPS automated equipment and possible uses, as well as the use of the ZIP + 4 identification codes.

**Special enumeration procedures.** This committee examined the various living situations and facilities that might require special enumeration procedures in 1990, such as difficult-to-enumerate and other situations that would not be amenable to the typical household field-collection procedures. Seven subcommittees researched past operations, developed detailed plans, and identified research areas for the specific components of the population. The subcommittees examined the areas of group quarters enumeration<sup>28</sup> (e.g., transient places such as hotels and motels), hard-to-enumerate situations (such as inner-city areas), American Indian and Alaska Native populations, military and civilian vessels populations, members of Congress and diplomats, Puerto Rico and the outlying areas,<sup>29</sup> and resort and seasonal housing areas. Major recommendations from the committee appeared in a final report (issued in July 1984 after a year of examination):

- To reduce response burden, the census should obtain some housing-unit data for multiunit buildings from the building management or maintenance staff.
- The census should not attempt to match persons enumerated in transient places (such as hotels and motels) with household addresses.
- American Indian tribal governments should be involved in all phases of the census planning.
- Military installations with housing for 50 or more people should be self-enumerating.
- Crews of civilian vessels should be allocated to their location or, if at sea, previous port or destination on Census Day, not at their homeport.
- The Department of State should aid in publicizing the census to the residents of embassies, consulates, etc., and in gaining their cooperation.
- The Bureau should pretest any new questions, questionnaire wording and format, and any new procedures to be implemented in 1990 in Puerto Rico.

<sup>26</sup>Update list/leave was a census method whereby a specially trained staff canvassed an area, updated a previously compiled address list and left a questionnaire at each residential address. The household was responsible for completing the questionnaire and mailing it back.

<sup>27</sup>A two-stage census is one in which the short- and long-form data are collected at two different points in time. That is, during the original delivery of questionnaires, all households receive a short form. At a later point, a sample of these households receives the long form with the additional data items.

<sup>28</sup>A type of living quarters found at certain places such as hospital wards, wards at jails, college or university dormitories, and large rooming and/or boarding houses, at which the occupants share some common facilities.

<sup>29</sup>The outlying areas for the 1990 census were American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, Virgin Islands of the United States, and the Republic of Palau.



- The Bureau should improve the procedures and training for taking the census in resort/seasonal housing areas, marinas, migrant camps, parklands, and “usual homes elsewhere.”

**Census requirements.** This committee, formed in 1982, was to determine data uses and needs of Federal agencies and State governments for incorporation into the 1990 questionnaire-development process. The committee’s findings and recommendations were based on a November 1982 survey that requested selected Federal agencies and State governments to report their uses and geographic level needed of census data, and the results of meetings with the Federal Agency Council (FAC; see p. 6-7).

Two years after their formation, the group released a series of formal memorandums summarizing the survey results. A primary conclusion was that questions needed to produce data at the block level had to be asked of all persons. Other data needed for larger geographic areas, such as cities or counties, could be gathered through a large sample applied equally across the country. Based on the survey, the following ought to be collected from 100 percent of the households and housing units: Household relationship, sex, race, age (single years), Hispanic origin, and income (total for household).

**Research review.** The Research Review Committee was formed in June 1982 to recommend 1990 census research projects to be given highest priority for funding for fiscal year 1984 and beyond. The group concluded its research with a final report in January 1983.

The committee based its assignment priorities on the major 1990 census planning objectives as issued by the Bureau: Cost efficiency, timely delivery of data products, continued high rate of coverage, maintenance/improvement of data quality, early capture of data, integrated automated geography and census taking, involving localities (administrative lists, local review, etc.), improved outreach, and so forth.

Recommendations getting the highest priority (needing to start the earliest) were as follows: Efficient methods of address list compilation, a good balance of coverage improvement research and evaluation, research of race/ethnicity questionnaire wording, use of alternative list sources for undercount estimates, telephone-data collection methods, use of a two-stage census, an automated temporary office (to aid in questionnaire editing and processing), alternative census training methods, and enumerator pay rates.

**Redistricting data.** The 1990 Census Redistricting Data Committee first met in June 1982 and completed its findings 1 year later. The 15 staff members from 10 divisions were to identify issues that must be considered in planning the 1990 census Public Law (P.L.) 94-171 Program, which required the Bureau to provide population counts to the States for redistricting. The final recommendations were issued by four redistricting subcommittees: (1) Outside Stakeholders, (2) Geography, (3) Processing, and (4) End Products.

The committee based its research and recommendations on the problems of the 1980 census program (through feedback from State officials and their technical staffs on the strengths and weaknesses of that program) and issues for consideration for the 1990 program. The group’s final recommendations for the 1990 census were that the Bureau—

- Enlarge the effort and resources devoted to establishing and maintaining contacts with appropriate persons in each State.
- Create a staff to promptly resolve problems and questions submitted by State personnel working on redistricting.
- Require that voting district boundaries follow 1990 block boundaries or the legal boundaries of counties, county subdivisions, or incorporated places wherever possible.
- Allow the use of nonstandard visible ground features (such as power lines and ridgelines) as block boundaries.
- “Freeze” geography early in the census enumeration process to stabilize geographic areas (boundaries) for tabulation and processing purposes.
- Allow a minimum of 5 months to review input files necessary in the redistricting operation.
- Plan for adequate Bureau staff review and correction time for various redistricting products, and monitor the entire process.

**Basic census design.** In July 1982, the Bureau initiated the Basic Census Design Methodologies 1990 Planning Committee to define a set of terms related to issues such as alternative census-taking and sampling methodologies. The dictionary of terms was released in February 1983 as the first 1990 decennial census informational memorandum (see app. 2B).

In addition to preparing the dictionary, the committee looked at basic design methodologies that could be considered for taking a census. This led to a final report in June 1983 that included the discussions and the dictionary of terms. The report was an orientation guide for persons unfamiliar with the issues of census-taking and sampling methods, and to raise issues to be studied and expanded upon prior to final procedures, operations, and evaluations. There were chapters on conventional census methodology, enumeration by mail, list/leave procedures, a two-stage census, Postal Service assistance, address list sources, use of administrative records, alternative methods for generating address registers, followup for nonrespondents, and sampling.

**Quality control (QC).** A QC committee was formed following the 1980 census to develop effective and efficient statistical quality control for 1990 census procedures and recommend promising options for the test censuses. The



group was made up of Bureau staff members with experience in subject-matter, field, processing-office, and other functional units of the organization. Based on 1980 census QA procedures and critical issues for 1990 planning, subcommittees researched four general areas that would relate to the 1985 test census preparatory activities, data collection, and data processing. In its March 1984 final report, the group recommended simplifying the QA of questionnaire package assembly, spreading the reinterview sample across all phases of the workload, and devising new ways to check field geocoding and followup. It especially called for monitoring the processing office checkin operation, as assuring accuracy there would reduce subsequent costs considerably.<sup>30</sup>

**Administrative records.** The Planning Committee on the Use of Administrative Records was formed following the 1980 census to study the feasibility of a census that used records already created for other purposes by Federal, State, or local government units (e.g., tax, social security, or licensing vehicle drivers) or by private or quasi-public organizations such as utility companies. Five subcommittees identified and explored advantages and drawbacks and reported on the following topics:

- Feasibility of an administrative-records census in 1990
- Issues relating to privacy, confidentiality, and public perception of such a census
- Current uses and potential sources of administrative records
- Uses of administrative records for content evaluation
- Access to State-maintained Medicaid and food stamps records

For the most part, the committee's report<sup>31</sup> did not make detailed recommendations, but specified issues and questions that would have to be resolved before a census based largely on administrative records could be taken.

**1990 content and products development task force.** In February 1984, the Bureau established a task force to assist in the general coordination of planning and implementation of questionnaire content and data-products development. The group met regularly through the test census planning cycle and prepared reports on the status of content and product projects assigned to respective divisions, raised and discussed issues and made recommendations for resolution, and was an open channel of communication and information exchange about activities in its

area. The task force also assisted generally in implementing the decennial work plans covering data requirements, data products, and content evaluation.

## MANAGEMENT AND COORDINATING COMMITTEES

The task of coordinating, managing, planning, implementing, budget monitoring, reporting, and problem solving for a decennial census, which included over 450 temporary district offices, 7 major processing sites, and a work force of over 500,000 during peak operations would take as much preparation as getting ready for the operations themselves. In early 1988, the Bureau's Decennial Planning Division (DPLD) organized a set of management and coordination groups for the tasks mentioned above. Their meetings were attended primarily by Bureau executive staff, decennial-related divisions' chiefs, and other staff members who could provide information, discuss issues, assign actions, or manage overall data collection and processing operations. Numerous other working groups monitored specific operations or programs and reported progress and problems to the "higher-level" groups for resolution. The following sections describe the management groups by hierarchy.

### Management Committees

In 1987, the Bureau created the position of Associate Director for Decennial Census, with overall responsibility for all of its aspects. The associate director met weekly with his own divisions' chiefs (DOD, DPLD, and GEO) and the Field Division chief to discuss 1990 planning progress and issues, and twice a week with other members of the executive staff to keep them informed and to gain their insights and perspectives of the program. The executive group reviewed cost and progress and made final decisions on major issues unresolved by the Implementation Plan Steering Committee (see below).

**Implementation Plan Steering Committee.** This group, later known simply as the Implementation Steering Committee and formed in 1985 upon a recommendation from the Decennial Census Decision Conferences (see pp. 17-18), was composed of the Associate Director for Decennial Census, the Assistant Director for Automated Data Processing, chiefs of Decennial Planning (DPLD), Decennial Operations (DOD), Geography (GEO), Field, Population, and Technical Services Divisions, chief of the Program Design Staff (DPLD), and the assistant chief for management (DPLD). It met weekly to review detailed plans prepared by various divisions for implementing the overall census plan. This group then sent recommendations on the plans monthly to the executive staff. The chief of the DPLD chaired the meetings.

In July 1988, this same high-level committee became known as the Implementation Steering Committee with a slightly redefined scope and charter. It maintained weekly

<sup>30</sup>"1990 Census Planning Committee on Quality Control—Final Report," March 30, 1984; issued as 1990 Decennial Census Informational Memorandum No. 28, Apr. 25, 1984. "Quality control" was the 1980 census term; 1990 used "quality assurance."

<sup>31</sup>"1990 Census Planning Committee on Use of Administrative Records—Final Report," 1990 Decennial Census Informational Memorandum No. 27, Apr. 25, 1984.

meetings, but now focused on managing and decision making. During the period of major census operations, the Associate Director for Decennial Census chaired the sessions, which addressed issues relating to automation, logistics, administrative support, operational work flow, and telecommunications. Additionally, issues that could not be resolved by the other working groups (see below) were directed to this group for resolution. In general, issues that could not be resolved by this group were referred to the Bureau's executive staff through this associate director.

**Operational Status Group.** This group was formed in June 1988 to review and report on the status of major census operations, such as the dress rehearsal, 1990 prelist, prec canvass, and so forth. Other functions included assessing the effects of plan deviations on other operations and resource requirements throughout the census. It determined what actions, if any, were necessary to meet the census objectives and goals. This group used the automated management information system's (MIS)<sup>32</sup> schedules and cost and progress reports, supplemented by other progress reports from various decennial divisions, as its basis for status assessment of operations. Also, it identified, reviewed, and resolved issues relating to procedure implementation by informing appropriate divisions of potential problems or procedural modifications.

The chief of DPLD chaired the meetings. Attendees included DPLD senior staff, responsible operations coordinators, and chiefs and relevant assistant division chiefs from the Decennial Operations, Field, and Geography Divisions. Other decennial divisions' chiefs were invited, depending on the agenda. Beginning in late July 1988, the frequency of the meetings intensified with the start of the first major operation for the 1990 census—national prelist.

**1990 Census Managers.** This group met regularly throughout the test census period (1983-1988) until the formation of the Operational Planning Group in 1988. The group convened weekly or biweekly, depending on the issues at hand. Representatives included assistant division and branch chiefs from all decennial-related divisions. The chief of the DPLD's Program Design Staff coordinated and chaired the meetings, which were to establish and coordinate the test census goals, operations designs, and site designations. The group also served as a forum for discussion and disseminating information concerning census planning to the appropriate divisions and as a mechanism for providing feedback to the DPLD from operational and support divisions.

**Operations Planning Group (OPG).** This group formed late in the decennial census cycle to plan and detail census procedures. Beginning in mid-1988, it began to refocus its

role from planning to implementing, and to act as an interdivisional forum for collective reviewing and decision making on issues such as modifications to address list development, enumeration and data-capture workflows, and processing. The OPG reviewed options for these, as well as observation reports from the Implementation Plan Steering Committee. The OPG identified procedural inconsistencies for determining short and long-term implications of the actions, and decided if design changes were necessary for 1990. Issues or interdivisional disagreements about operations were referred to the OPG for resolution. Recommendations or issues that involved policy changes, or that could not be resolved by the OPG, were referred to the Implementation Steering Committee.

Depending on the agenda, DPLD's assistant division chief for operations or its Program Design Staff chief chaired the weekly meetings. The DPLD recorded and issued minutes. Formal decisions were further documented in the Decennial Census Informational Memorandum series and the 1990 Requirements Overviews (see list in app. 2B).

**Steering Committee on 1990 Recruiting.** This committee was established in May 1985 to explore issues related to recruiting for the 1990 decennial census as well as to develop strategies for producing qualified candidates in sufficient numbers to staff operations at optimal levels from the beginning of enumeration and maintaining those levels throughout. The committee was chaired by the chief, Field Division, and met monthly, beginning in June 1985, with representatives from all decennial-related divisions. Each meeting had a specific agenda; the group worked through the issue(s) scheduled for discussion and formulated a set of specific recommendations. The results of each meeting were summarized and distributed to the participants. The committee concluded its deliberations in 1989, after review of the test census cycle, with a report documenting the group's findings for a recruiting design and implementation plan for the 1990 census.

**Management information system (MIS) managers.** This group was formed to review and manage the Director's MIS. Other tasks the group had included developing, designing, and implementing the MIS; coordinating responsible division contact designations and resolving problems through them; reviewing census schedules; reviewing MIS cost and progress and flagging potential problems; and transmitting the MIS reports to the Director. Initially, the group met once a month; however, as 1990 census preparations intensified, it increased its meeting frequency to once a week. The assistant division chief for management (DPLD) chaired the meetings. Other attendees were the chief of the Management Information Branch (DPLD); operations coordinators from various divisions (as necessary); MIS resource staff; and other Bureau staff members with specialized knowledge in areas such as operations and software (as necessary).

<sup>32</sup>An automated system allowing cost and progress of census operations to be monitored at the district office, regional census center, and headquarters. The main purpose of the system, however, was to give the Director of the Census Bureau regular reports on the progress of the census.

As the census reached its peak in June 1990, the weekly meetings were insufficient for monitoring daily census progress. Thus, the meetings were supplemented by MIS coordinators telephoning appropriate decennial division staff members daily to explain or resolve problems. The results were discussed during the meetings and further actions proposed when necessary.

**Automation and Logistics Planning Group.** This working group consisted of decennial-related divisions with responsibility for the design, implementation/acquisition, installation, maintenance, and coordination of automated and logistical systems in support of the 1990 census. Participants generally included the assistant chief for management (DPLD—and chair of the group), chief of the Automation Coordination Branch (DPLD), assistant chiefs for processing systems and special systems (DOD), assistant chief for automation technology (FLD), chief of the Census Processing Branch (FLD), chiefs of the Telecommunications and Minicomputer Staffs, chief of Automated Data Processing (ADP) Planning and Acquisition Staff, chief of the Systems Support Division (SSD), and the chief of the Procurement Office.

The group was formed in November 1988 to deal with the technical aspects of the census's automated data processing operations. The objective was to identify actual or potential problems and resolve them in as timely a manner as possible. Topical agendas and resulting minutes were produced for each meeting by the DPLD's Automation Coordination Branch. The group completed its technical support in mid-1990, but continued monthly assessments (accomplishments, issues, problems) of ADP-related census operations through the end of the 1990 census.

**Undercount Steering Committee.** This group began meeting informally early in the 1980 decade to discuss and advise the Bureau on issues regarding statistical adjustment of census counts. The participants were the Associate Directors for Decennial Census, Demographic Programs, and Statistical Methodology and Standards; the Assistant Director of Decennial Censuses; chiefs of the Statistical Support, Population, Decennial Planning, and Statistical Research Divisions; and the Bureau's senior mathematical statistician. The chief of the Program and Policy Development Office chaired the early meetings. As the early stages of the 1990 census began and the legal pressures from States demanding an adjusted census grew, it became apparent that the Bureau needed a more formal advisory group on the topic. In mid-1989, the Bureau identified the group as the Undercount Steering Committee. Participation remained the same with the exception of a new chair—the chief of the Population Division. The purpose of the committee was to advise the Bureau on the relative accuracy of adjusted versus unadjusted 1990

census counts. In June 1990, the committee concluded its assessments and produced a detailed report explaining its decision on the adjustment issue. (Cf. chs. 1, 11, and 12.) Following the 1990 census, the committee continued its technical advice for the remainder of the decade and in planning for the 2000 census.

## Coordinating Committees

**Test censuses.** A coordinating committee was organized to develop, monitor, and assess current plans and operations for each test census and the dress rehearsal. It was made up of designated coordinators from each division directly involved. Attendance occasionally included Bureau personnel with specific knowledge or background on issues being discussed during the meeting. Overall, each committee was organized approximately one year before the beginning of the test and continued to meet through the completion of data processing and the issuance of the data products (about 1 1/2 years). Early meetings were biweekly and increased in frequency (to weekly) around the mailout of questionnaires and the test Census Day. During data processing and the data products preparation, the meetings usually decreased to monthly.

Early meetings dealt with the development and finalization of operational plans. During the tests, the discussions centered on operational status and resolving problems. The Project Coordination Branch of the Decennial Planning Division had the overall responsibility for scheduling, agendas, and issuing official meeting reports.

**1990 census.** In early 1987, the Decennial Planning Division (DPLD) established the 1990 National Prelist Coordinators' Group in preparation for the first major 1990 census operation—national prelist. The group met weekly (DPLD chaired and coordinated it) to review and address operational status, costs, and problems to ensure a successful implementation of plans.

**Other.** In addition to the previously mentioned planning groups, ongoing coordinating groups covering numerous areas of the census process were organized later in the planning cycle for the purpose of finalizing, coordinating, and carrying out the plans developed earlier in the census cycle by the assessment and planning committees (see above). A problem with planning early in the decade was the inherent hazard associated with predicting the future. These specialized working groups oversaw the plans through the period leading up to the census and modified them when necessary.

Participants in the committees (see box) were usually the same representatives from the previous topical groups. They identified problems and implemented new procedures to resolve them.

## LIST OF INTERNAL COORDINATING COMMITTEES FOR THE 1990 DECENNIAL CENSUS

Action Plan Groups  
Address List Development Working Group  
Cities Conference Working Group  
Content Task Force  
Count Resolution Task Force  
Data Products Planning Group  
Data Products Working Group  
Disclosure Avoidance Working Group  
Edit and Imputation Working Group  
Local Review Working Group  
1987 Prelist Quality Control Task Force  
1990 American Indian/Alaska Native  
Programs Task Force  
1990 Local Review Implementation  
Working Group  
1990 Outreach Committee  
1990 Prelist Coordinators  
1990 Quality Control Committee  
1990 Redistricting Data Planning Committee  
Outlying Areas Working Group  
Puerto Rico Working Group  
Questionnaire Design Working Group  
Search and Match Add Rules Working Group  
Software Quality Assurance Committee  
Task Force on Geographic Training for  
Enumerators  
Task Force on Questionnaire Printing,  
Assembly, Labeling, and Mailing  
Telecommunication Task Force  
U.S. Post Office Task Force

## TESTS OF NAVIGATIONAL TRACKING SYSTEMS

The Census Bureau explored the possibility of using a radio-navigational system as the basis for recording the location of rural residences listed in the field for the 1990 census. In 1981, the Bureau gave the Transportation Systems Center (TSC) of the Department of Transportation the requirements for a terrestrial navigation system and contracted with it to evaluate how well existing and planned navigational systems could meet these requirements. The Long Range Navigational System (LORAN-C) operated by the U.S. Coast Guard was identified as being closest to doing this. LORAN-C was a system capable of determining positions on the earth's surface through the use of low-frequency radio signals). However, the census needed a LORAN field device (LFD) that would meet the operational needs of enumeration, mapping, and geocoding. The Bureau assessed the feasibility of either obtaining or developing a useful LFD by examining each census requirement and estimating the technical risk involved in satisfying it. The objectives for the receiver were (1) to measure precisely

the location of each living quarters and business establishment for the purpose of assigning geographic coordinates that census staff could use to return to the same unit, (2) to assign it to its basic geographic codes, and (3) to provide greater flexibility in defining units for data-collection activities through the use of geographic coordinates rather than the traditional identification by census enumerators on maps. Benefits of the system were 24-hour accessibility on a year-round basis, no access or user fees, and off-the-shelf portability. However, the risks included lack of the extreme accuracy needed to exactly pinpoint ground locations. Further, LFD coverage was limited to only portions of the continental United States (which excluded the central core of the Nation, Alaska, Hawaii, Puerto Rico, and the outlying areas). Portable receivers did not meet the Bureau's requirements of being lightweight, user-friendly, unobtrusive, and capable of recording data. In addition, receiver accuracy was affected significantly by changes in weather and by electrical fields created by power lines. Another limitation to the project was the estimated cost of developing a LORAN-C receiver to meet the Bureau's specifications—approximately \$330,000. The estimated price of receivers for enumerators' use during the 1990 census was as high as \$1,000 per unit—for 20,000 to 30,000 units—and a total of \$20 million to \$30 million. These figures did not include training, quality control, maintenance, storage, or additional testing.

In early 1983, the Bureau contracted with the TSC to assess the state-of-the-art LORAN-C receivers. The assessment, issued in February 1983, concluded that the standard off-the-shelf receiver was not capable of meeting the census's data-entry and configuration requirements. However, a specifically designed LFD could make significant improvements in the efficiency and accuracy of census operations. The proposal also outlined the steps necessary to acquire one and recommended that the Bureau allow for additional testing and developing of a prototype LFD unit as an aid in finalizing requirements.

During July 5-8 and August 22-23, 1983, the Bureau tested commercial equipment, carried in an automobile, in Essex County, MA, to obtain information about the potential for using hand-held LORAN-C receivers for census field work. During the tests, preliminary technical readings were taken at 50 and 20 points,<sup>33</sup> respectively, with the goal of using the LORAN-C equipment to re-locate them.

During the first test, the vehicle was equipped with a standard antenna that had to be held out of the car window, which created reception problems. The unit lost its "lock" on the LORAN-C signal 10 times. It took an average of 3 1/2 to 4 minutes to reacquire the signal, and in a few cases the signal could not be retained without driving to another area. This significant amount of extra time would present serious problems for an enumerator working on piece rate. The loss of signal was attributed to two factors: the grounding out of the antenna by hand-holding it outside of

<sup>33</sup>Points consisted of buildings, county boundaries, street intersections, and other specific locations.

the car or by signal interference from overhead power lines, transformers, etc. Also, if an antenna, while sticking out of the car window, touched the car's metal or the operator's body, the signal would be lost.

During the second test, the TSC provided the Bureau with a modified antenna mounted on top of the auto, under the belief that this would eliminate most loss-of-signal problems. After initial testing with this antenna, signal loss was cut in half and reacquisition time was improved to 30 seconds from 4 minutes in attempting to locate the 20 points. For this test, the unit's "arrival alarm" was set to sound when it got to within 50 feet of each point. However, in the attempt to locate a particular point on four different occasions, the bearing on the unit indicated that the searchers should drive in a direction that was exactly opposite to the point's location. Additional problems included sensitivity to sudden changes in weather conditions as well as human errors in operating the equipment.

Overall, of the 70 points set and tested, only a minimum number were located within 25 feet of the target through the proper cycle of the LORAN-C receiver. Also, the Bureau concluded that the high number of failed cases could result in confusion and/or errors during the 1990 census field work. The cycle slips<sup>34</sup> presented serious problems because of the size of the error associated with them; if the LORAN-C were used to locate legal boundaries for the purpose of allocating housing units, a cycle slip could result in a large misallocation.

Building on the idea of a LORAN-C navigation system, the Census Bureau examined another navigational tracking system then being developed for the Department of Defense, but possibly available for commercial use in time for the 1990 census. This was a network of satellites for location determination. The complete system was to be made up of 18 satellites, which would not be in place until 1989. However, the Bureau's needs for a two-dimensional system could be met after 12 satellites were in orbit, in mid to late 1987.

The system worked on two different codes, one for military use and another for civilian use. The system was very precise, with the civilian code locating points within 30 to 100 meters, but a problem existed with the level of accuracy permitted by the Defense Department. The Bureau was unable to predict to what degree the military might degrade the code.

Developmental work also was taking place on hand-held receivers; however, with portability in mind, the only receiver then available was worn like a backpack and weighed 17 pounds. Although the manufacturer's representatives pointed out that the cost of receivers had been dropping at a rate of 22 percent per year and that the cost might reach \$500 in early 1990's, the least expensive receiver available at the

time cost approximately \$2,500. With these problems and a very capricious system, the Bureau decided that system was not feasible for use in the 1990 census.

In 1983, a commercial firm applied to the Federal Communications Commission for authority to construct and launch four satellites to provide radio determination services. These satellites were to be maintained in stationary orbits. This configuration, with projected launch dates in 1987, would provide complete coverage of the 48 contiguous States. The system, called GEOSTAR, was to be able to determine locations within a few meters, except in Alaska. Unlike the LORAN-C system, power lines would not affect the satellites' signals and therefore the accuracy of the location readings. Also, unlike either of the other two systems, communication and data transmission would be possible, with the capacity to transmit 30 million 256-bit messages per hour. Special codes could be used with the system to maintain the security of any transmission. At the time, a hand-held receiver, weighing approximately one pound, was being developed with a cost projected to be approximately \$450. The rates for the use of the system had not yet been established, and it appeared at the time that there would have to be several more years of development before it would be ready for a census application.

On May 2, 1984, the decision was made not to allocate additional funds for continued investigation of the LFD technology. However, the Geography Division continued to keep abreast of new developments in the radio-navigational field and issued annual reports on them.

## TEST CENSUSES AND DRESS REHEARSAL

One of the most important components of the planning for 1990 was the series of test censuses from 1984 through 1987, a dress rehearsal census in 1988, and a special survey in 1989. In the past, the Bureau relied greatly on "pretest" censuses during the years leading up to each decennial census. These tests were designed to develop and examine the feasibility and cost-effectiveness of alternative or new field methodologies, enumeration procedures, and questionnaire content. The tests for the 1990 cycle focused on more effective data-collection methods to meet the needs of a growing and increasingly complex, diverse society; increased automation throughout all aspects of census taking; alternative and efficient techniques for creating and updating a national mailing list; improved methods to evaluate the accuracy of the counts and possibly to adjust the counts at small geographic levels; and quicker availability of data products with a wider selection of more useful formats for the various data users. The major events in the planning cycle were an Address List Compilation Test in two cities in Connecticut and three counties in Texas and Georgia (1984); five test censuses (minicensuses in which selected facets of enumeration were studied) in Jersey City, NJ and Tampa, FL (1985), central Los Angeles County, CA and east central Mississippi (1986), and north central North Dakota (1987); the full dress rehearsal in St. Louis city and east central Missouri

<sup>34</sup>A LORAN receiver tracked the radio signals at a precise point. If the signals were weak, the receiver might track the wrong point, which would result in a time-difference error of almost exactly +10 or -10 microseconds. This caused an error of at least 1 mile in position.

and several rural counties in eastern Washington; and a special survey in 1989 to test the race question. During the dress rehearsal, efforts were made to keep the testing of new procedural and questionnaire alternatives to a minimum, with the intent of changing only those methodologies that proved to have problems because they were expected to be used in 1990. In addition to these tests, the Bureau undertook several research projects, fellowship programs, and consulting contracts.

The extensive evaluation process for the tests consisted of formal statistical analyses, time studies, reports based on personal visits to training and field operations, headquarters interdivisional meetings, and staff debriefings. The results of these analyses appeared in a series of results memorandums that are listed in appendix 2B; the factfinding visits to field offices were recounted in "field observation reports"; and other observations or decisions were included in interdivisional memorandums.

### Address List Compilation Test (1984)

Because self-enumeration by mail for the 1970 and 1980 censuses proved effective and was to be expanded for 1990, an accurate mailing list for the census became essential. In addition to the cost efficiency of self-enumeration, the methods for developing and maintaining the mailing lists also had to be cost efficient. Although the methods used to prepare the 1980 mailing lists were successful, for 1990 the Bureau wanted to look for additional ways to improve their accuracy and lower their costs. The General Accounting Office suggested that the Bureau try using U.S. Postal Service (USPS) mailing lists and an updated 1980 census list.

The 1984 address list compilation test (ALCT), in the cities of Bridgeport and Hartford, CT, and in three rural counties—Hardin (TX) and Gordon and Murray (GA), was designed to evaluate several methods of compiling and updating the basic residential address list for 1990. The focus in the cities was to compare three initial address-list sources in an urban setting in terms of their effect on coverage and cost: Commercial vendor mailing lists, a USPS-compiled list, and the 1980 updated census address file. The Bureau compared these lists in conjunction with several update procedures. In Hartford, all three lists were compiled and then updated in a prec canvass operation, in which census enumerators canvassed door-to-door, adding, deleting, or correcting the addresses as necessary based on what actually existed on the ground. In Bridgeport, the vendor list and the 1980 census list were compiled and then updated in a postal casing check<sup>35</sup> and a prec canvass. In the rural counties, two types of compilation were

tested: (1) a prelist (census enumerators traveled assigned areas to record mailing addresses and location descriptions of all places where people live or might live) with a postal casing check and (2) a list created by the USPS and updated by a dependent canvass. Neither the list-creation sources nor updating techniques were evaluated by themselves in the ALCT; rather, the purpose was to evaluate the update methods in combination with initial sources.

**Hartford and Bridgeport, CT.** In the cities of Hartford and Bridgeport, three initial-list sources were tested. The first was the purchase of lists from a commercial vendor. The advantage of purchasing was its relatively economic and successful use during the 1980 census and that such lists were likely to have been kept current. Therefore, the test used the vendor's list as the standard against which the other lists were measured. The second, as an alternative source, was developed by the USPS on the theory that it was in a position to best compile an accurate and complete mailing list. The Bureau had to purchase this list from the USPS at the cost of the work. The final method was to use the 1980 census address list, updated by one or more address changes during the decade. All three sources were evaluated for Hartford, while for Bridgeport, only the vendor and 1980 census lists were compared. The following chart summarizes the urban test experimental design.

### Test Site

Hartford		Bridgeport	
Initial list	Updating method	Initial list	Updating method
Vendor 1980 USPS	Precanvass Precanvass Precanvass	Vendor Vendor 1980 1980	Precanvass Casing check Precanvass Casing check

Selection of Hartford and Bridgeport was based on specific criteria set by the Bureau, such as requiring that the sites have between 40,000 and 60,000 housing units and be similar cities. The two areas each contained about 55,000 year-round housing units at the time of the 1980 census. Other factors for selection included working conditions that would simulate, as closely as possible, those that would be present in the 1990 census, such as a substantial number of small (2- to 9-unit) multiunit structures, significant portions of Black (33.9 and 21 percent, respectively) and Spanish/Hispanic populations (20.5 and 18.7 percent, respectively), reasonable numbers of special places,<sup>36</sup> and some growth since 1980. The size of the areas conformed to budgetary allotments, and their proximity (both under the Boston regional office) was efficient for things such as training, oversight, and so forth.

<sup>35</sup>An address check in which USPS carriers sorted preprinted address cards (one address printed on each card for every address on the census file) into the proper slots in their delivery cases to determine if there were any missing, duplicate, or undeliverable addresses. (For more information, see ch. 4.)

<sup>36</sup>A place where people either lived or stayed (other than the usual house, apartment, or mobile home), such as a college or university, large rooming or boarding house, hotel or motel, marina, nursing home, hospital, or prison.



Updating procedures consisted of two methods: a dependent canvass of the addresses by census enumerators and a USPS casing check. The dependent canvass required enumerators to visit each housing unit in an assigned area and make changes—adds, deletes, and corrections—to the listings as needed. All three Hartford lists were canvassed simultaneously by enumerators, as were the two Bridgeport lists. Enumerators used books containing the listings designated for the assignment area. For each residential address on the ground, they verified that it was present and correct; if not, they corrected the listing. As a quality-assurance (QA) measure, 9 or 10 housing unit addresses were suppressed (removed) from the dependent canvass operation for each ARA<sup>37</sup> and verified to exist by QA enumerators prior to the start of the canvassing. As the dependent canvass operation was completed for an assignment, the QA enumerator checked to see that the dependent-canvass enumerator had added the suppressed units. Each missed unit counted as an error and the work was accepted or rejected based on the number of errors.

Following the dependent canvassing operation, the USPS conducted the casing check operation for addresses from both the 1980 census and vendor lists for Bridgeport. The Bureau created an address card for each address listed in the automated file. The address cards consisted of two sections: Section A instructed the postal carrier on how to mark the card. Section B contained the mailing address for the unit; this included the house number (with suffix if appropriate), street name (including type and direction prefix and/or suffix), apartment designation or special place name, city name, State abbreviation, and ZIP Code. As the USPS requested, the cards were sorted in carrier-route sequence before being sent to the main post office in Bridgeport. Each carrier cased (put in delivery order) the cards for his or her route. If an address was in error, the carrier marked the appropriate box in section A and corrected the mailing address in section B. Carriers deleted duplicated and undeliverable addresses by marking the appropriate box in section A.

If the carrier did not receive a card for a housing unit or special place, he or she prepared a blue card for the missing address.

The address changes from the dependent canvass were updated by the Bureau's regional office clerks by transcribing them by hand, line by line, to correction registers. New units were added to the next available blank lines in the new register. The updated registers then were keyed and the computer files were updated with these changes. Address corrections from the casing check were made in the Data Preparation Division (DPD) in Jeffersonville, IN.

<sup>37</sup>Address register area, a geographic area established for data collection purposes. It usually consisted of several neighboring census blocks.

In Hartford, the vendor list, due to its low cost and the Bureau's experience and previous success in using it, was the standard against which the other lists were measured. Regarding the initial lists, the results showed that the USPS list was the most expensive of the three sources. The higher costs were associated with the way the USPS list was created—by postal carriers entering addresses for every housing unit and special place on their routes on special listing pages and census workers keying the addresses to create the file. The USPS cost, which included training postal carriers, was \$53,026, compared with the total cost of \$2,560 for the vendor list and \$8,250 for the 1980 census list (\$0.97, \$0.05, and \$0.15 per record, respectively). The Bureau had updated the 1980 list prior to the ALCT with adds, deletes, and corrections from the 1980 coverage improvement operations. Additionally, based on the initial lists and compared with the vendor list, the 1980 list had 4.3 percent more valid<sup>38</sup> housing units, while the USPS list had 2.8 percent more. The following chart summarizes the initial lists by cost and validity of addresses.

Source	Total units	Total valid/ percent	Cost	
			Total	Per unit
Vendor . . . . .	50,634	48,640 (96.1)	\$2,561	\$0.05
USPS . . . . .	54,313	49,988 (92.1)	53,026	0.97
1980 census . . .	54,268	50,752 (93.5)	8,250	0.15

The dependent canvass in Hartford narrowed considerably the coverage gap between the number of valid and original listings for the vendor list. The quality of the addresses in the initial lists was evaluated by the number of corrections<sup>39</sup> made during the dependent canvass. For the vendor list, there were 2,429 corrections to apartment designations and basic street addresses, as compared with 3,366 and 1,378 corrections to the USPS and 1980 census lists, respectively. This measurement indicated that the addresses in the 1980 census list had the highest quality and the addresses in the USPS list the worst—primarily due to missing or incorrect apartment designations (because the USPS delivered mail by building, not unit, address). Approximately one-third of the apartment designations were missing from multiunit addresses in the USPS list; in the other two lists, the comparable figure was less than 5 percent.

In Bridgeport, similar results were found. On a per record basis for the two types of initial lists, the vendor list was the least expensive, while the 1980 list was 2 1/2 times more expensive (\$0.15 per record vs. \$0.06). However, based on the initial lists and compared with the vendor list,

<sup>38</sup>Housing units were determined to be "valid" if they fell within the test area and were used for residential purposes.

<sup>39</sup>The term "correction" was defined as any change in the address and did not imply that the final or corrected version of the address was more accurate than the original version.



the 1980 list had 3.9 percent more valid addresses. The following chart summarizes the initial address lists by coverage and cost.

Source	Total units	Total valid /percent	No. of records	Cost	
				Total	Per record
Vendor...	48,667	47,293 (98.5)	51,359	\$2,885	\$0.06
1980....	52,017	49,114 (94.4)	55,410	8,250	0.15

After the dependent canvass update, the 1980 list had 1,157 corrections versus 1,688 corrections to the vendor addresses. However, it appeared that the relative success of the 1980-list approach had to be tempered by the fact that there had not been much change in the housing inventory in these areas since 1980. Therefore, it would be unreasonable to assume this approach would do well in 1990 for high-growth areas.

Following the test, the Bureau decided that the initial address list for urban areas for 1990 would be purchased from a commercial vendor, updated by Postal Service reviews and a census precavass operation. This decision was reached because the ALCT did not rule out any of the methods tested to compile the address list, nor did it identify any as clearly superior to the others in terms of coverage. However, the very high cost and significant planning, control, and operational risks involved with the USPS list ruled it out as the address source for urban areas. The coverage differentials between the initial lists were narrowed considerably after only one update. Also, while the 1980 census list did well in Bridgeport and Hartford, the Bureau chose not to use it nationwide for the 1990 census, primarily because the relative quality of the 1980 census list would probably be diminished over a 10-year period, especially in high-growth areas.

**Hardin County, TX and Gordon and Murray Counties, GA.** The rural ALCT had two initial list sources—a prelist operation and the USPS listing. The same two updating techniques as in the urban areas were used, a USPS casing check and a precavass operation by enumerators. Again, the purpose was to see how well the initial lists worked in combination with updating methods. The prelist method had been successful in the past; therefore, it was the standard against which to measure the alternative source (USPS list).

In rural areas that did not have house-number/street-name addresses, the census needed a physical location description, along with the mailing address for geographic coding, to supplement the address of a housing unit or special place. This was because (1) an enumerator would have to locate each housing unit should a followup visit be necessary, and (2) as in all other areas, all units within a geographic entity would need to be allocated to blocks for tabulation purposes. So the Bureau was looking for the most accurate and efficient method of obtaining this information.

The selection of the test sites was based on specific criteria that would best represent 1990 conditions in rural prelist areas. The Bureau wanted one or more rural sites located in the southern or western portions of the Nation, each containing approximately 15,000 housing units (because of budget constraints), and containing a mix of address types. Due to the presence of American Indian reservations, many seasonal housing units, very sparse settlement or large (land and/or population) counties, there did not appear to be a suitable site farther west. After consideration of areas in Georgia, Virginia, Mississippi, Texas, and Louisiana, the final two sites of Hardin County, TX, and a pair of Georgia counties, Gordon and Murray, were selected.

The prelisting of the three counties took place 6 months prior to updating the address lists and required census enumerators to canvass assigned areas and list in an address register the mailing address and location description (if appropriate) of every housing unit. In addition to this, the enumerators spotted and numbered the location of each housing unit on a census map. As a quality-assurance measure, different enumerators listed a selected number of housing units in advance of the prelist. Following the prelist operation, the two sets of addresses were matched and corrections made where necessary. If a prelist register contained two or more verified enumerator errors, its area was recavassed. At the completion of prelist, the address registers were sent to the DPD in Jeffersonville, IN, where the addresses and other information were keyed into a computer file.

The second means of address compilation was done by the USPS under contract, giving the Bureau the mailing address and geographic location of every housing unit within the test sites. As in the urban areas, postal carriers entered on address listing sheets the mailing address of every housing unit and special place on their routes. Carriers also assigned each living quarters to its census geographic codes and spotted and numbered the location of each unit on census maps. For rural route and lockbox addresses or general delivery, carriers were to include a location description of the structure and the householder's name. DPD staff keyed the listing sheets to form the Bureau's computerized address tape file. Ordinarily, the USPS was prohibited by law from disclosing such address and location information; however, temporary legislation permitted it to provide address lists specifically for the test.

Following the 6-month interval, the address lists were updated using a procedure, similar to the updating in the urban areas test, designed to eliminate undercoverage created by this time lag. During an actual census, this could range from 18 to 24 months between list compilation and Census Day. In both sites, the prelist was updated by a USPS casing check, and the USPS list was updated by a dependent canvass by enumerators. Corrections from the updating procedures (including a field check by enumerators for discrepant USPS corrections to the prelist addresses) were sent to the DPD where they were applied to the address file.

The results of the rural test were determined in a fashion similar to those in the urban test. The initial lists were evaluated for cost (based on the cost per valid address) and coverage (the number of correct addresses within the sample area). The updated lists also were evaluated for cost and coverage. The costs were measured by comparing the dependent canvass with the casing check. For coverage evaluation, clerks matched the two updated address lists to each other by geography to identify differences. Addresses were considered valid if they matched between the lists and the geographic codes were the same.

The actual time to complete the matching began to take longer than expected and would have resulted in cost overruns and timing problems. To avoid these problems and because reliable data could be obtained from a subset of ARA's, a decision was made to subsample the test areas to ensure completion of the test. As stated earlier, validity and geographic status had to be determined for each unit; however, matching was not enough and a field reconciliation was required for cases that could not be resolved in the office (e.g., possible duplicates or missed units). Examination of the coverage of special places was dropped because of too few places in the sample.

For the initial lists in Texas, the USPS list contained 16.4 percent more total housing units but about 4 percent fewer "valid" addresses relative to the prelist. The prelist appeared to offer better coverage than the USPS list. However, the cost per valid address was slightly more expensive for the prelist (\$2.97) than for the USPS list (\$2.63). The prelist cost included printing and assembling address registers, the field activities, keying, quality assurance, programming, and address corrections, but not matching or reconciliation. The USPS cost was for creating the list plus having carriers correct any census geography codes and map spots. The USPS list contained by far the most number of duplicate listings, attributed to postal carriers not following the Bureau's instructions. The following chart summarizes the initial lists by coverage and cost.

Source	Coverage			Cost		
	Total housing units	Total valid units/percent	Duplicate units	Total addresses	Total cost	Cost per address
Prelist.....	5,147	4,868 (94.6)	64	16,450	\$48,846	\$2.97
USPS.....	5,990	4,678 (78.1)	977	18,892	\$49,093	2.63

After updating, the USPS Texas list contained 17.7 percent more total housing units (6,459 vs. 5,486) but about 0.2 percent fewer "valid" addresses (5,087 vs. 5,098). The Bureau concluded that the prelist provided better coverage than the USPS list. Also, the updating cost per valid address was more expensive for the USPS list (\$7.30) than for the prelist (\$4.12). This was due to the cost of the dependent canvass as compared with the cost of the casing check.

In Georgia, similar results were found (e.g., the initial USPS list had more total housing units but 0.6 percent less valid units than the prelist) with the exception of the initial list cost (see table below). In Texas, the initial USPS list was cheaper, while in Georgia, the prelist cost less. Also, the USPS had significant problems with delineating valid geographic locations and difficulty in mapspotting addresses. This created problems, since the Census Bureau relied heavily on a geographic reference system and geographic codes were needed for an address to be added to the address list. The number of total duplicates was again higher for the USPS list.

Source	Coverage			Cost		
	Total housing units	Total valid units/percent	Duplicate units	Total addresses	Total cost	Cost per address
Prelist.....	4,691	4,289 (91.4)	21	19,300	\$49,307	\$2.55
USPS.....	4,411	4,262 (96.6)	57	19,307	57,884	3.00

After updating, the USPS list did not provide significantly better coverage but was significantly more expensive—due to the costs associated with the dependent canvass as compared with a casing check. Based on these test findings, the Bureau decided to use the prelist methodology with a USPS casing check to create the address list in rural areas in the 1990 census.

The total cost of the ALCT was \$1,555,000.

### 1985 Test Censuses

The first major operational test for the 1990 census was in 1985 in Jersey City, NJ, and Tampa, FL, with Census Day on March 24. (Since Census Day (April 1) for the 1990 census would be 2 weeks before Easter Sunday, Census Day for the tests was likewise 2 weeks before Easter Sunday in order to evaluate the difficulty of hiring staff to do nonresponse followup around the Easter weekend.) The Bureau used this test to study two major objectives: (1) to make an initial attempt to automate many of the data-collection tasks used in the 1980 census and (2) to examine the idea of a two-stage data-collection methodology in areas historically difficult to enumerate (i.e., central parts of large cities). The Bureau believed that automation had immense potential to improve the census-taking process. Other things tested included improving the procedures the post office used to review address lists, particularly for multiunit structures; a unit-by-unit address-list precavass rather than a structure precavass as in the 1970 and 1980 censuses, to obtain an actual address designation or description for each unit and compare them with the Bureau's mailing list; and a two-phase local review in which local officials received precensus housing-unit and special-place counts and postcensus housing-unit and population counts by block, including vacancy percentages

and group-quarters population counts for review against their records. (Population counts and vacancy rates were by tract and were for information only, not for review and challenge.) Both sites had the same automated processing system for fundamental tasks; however, in Tampa the focus was on the automation of collection methods, and in Jersey City, on two-stage data collection. As part of this automation test, a major innovation tested was the use of optical mark recognition (OMR) as a data-conversion and processing technique. An OMR form, in order to be machine-readable, had to be marked with a No. 2 carbon-base pencil. To encourage respondents to use it, this type of pencil was included in each OMR mailing package. In Tampa, this technology retrieved data from the short-form questionnaires, while traditional keying of data was used in Jersey City. Long-form responses were keyed in both areas.

The "two-stage" collection-method test consisted of a first stage in which the USPS delivered short-form questionnaires to all addresses; later, census takers visited those addresses from which there was no response by mail, to collect the information as in a traditional mailout/mailback followup. In the second stage of this test, the USPS delivered long-form questionnaires to a sample (1-in-5) of residential addresses, and again, the plan was for census takers to visit nonrespondents. The test was designed to determine if collection of the basic-count items could be completed more quickly by doing it in the first of two stages rather than by including sampling (long forms) in the traditional one-stage method. Additionally, the test compared the coverage resulting from each method, the relative costs of the methods, and their effects on the quality of the sample data.

**Tampa, FL.** In Tampa, the Bureau wanted to study the feasibility of automating many of the clerical functions in the 1980 census mailout/mailback design, including questionnaire changes necessary to accommodate automation and Postal Service requirements.

Tampa was chosen for the test because it was a large urban area (271,577 population at the time) where there were few major enumeration difficulties during the 1980 census. The Bureau wanted to avoid a site that might pose unusual problems, in order to test the automation plans rather than the ability to overcome enumeration problems. The area also contained a significant minority population (23.0 percent Black, 13.3 percent Hispanic, 0.7 percent Asian or Pacific Islander, and 0.2 percent American Indian), offering the opportunity to gain more experience in enumerating minority communities; and contained only a relatively small number of places with special living arrangements (e.g., hospitals, college or university dormitories, or a large U.S. Air Force base), therefore reducing the chances of complications arising from the enumeration of these types of living quarters. Tampa had been recommended by some participants at a Bureau-sponsored joint meeting of minority representatives in January 1984 (see p. 9).

Even though the automated system was evaluated at both sites, the test in Tampa was the primary measure of the system's effectiveness, due to the number of other studies in the two-stage test in Jersey City. The basic approach of the test emphasized the creation of a geographically structured address control file (ACF) to be maintained on the mainframe computer at Suitland headquarters. The collection office (CO), managed by a locally hired person, used demand terminals on dedicated lines to update the ACF. The office opened in December 1984 and closed in September 1985. It was supported by a single processing office in Jeffersonville, IN, where questionnaires were checked in automatically by electronic laser sorters that read bar codes preprinted on the questionnaires. This was a new method being tested as part of the automation system; the address, a barcode, and the questionnaire identification number already had been printed directly onto the questionnaire in one printing pass, eliminating the need for clerks to manually add the serial numbers to the questionnaires.

The Tampa test was to answer three major questions: Could the Bureau create and maintain a geographically structured address control file? What system requirements were necessary to automate data capture operations without FOSDIC? Finally, what communications and security measures would be required for separate collection and processing offices—an operation in which questionnaires were returned directly to the processing office? Another procedure exclusive to the Tampa test was the use of mail reminder cards before starting any nonresponse followup, reminding respondents that time still remained to return their questionnaires. The cards were only sent to nonresponding households. They proved successful in increasing response rates 8 percentage points. The 1986 test censuses (see below) expanded the usage of the reminder card to two phases of delivery (see below).

Regarding the automation of data capture without FOSDIC, the staff experimented with new technologies in processing the Tampa questionnaires. The new computer-controlled optical mark recognition (OMR) system converted responses on the questionnaires directly to digital data. This computerization led to the first use of concurrent processing, permitting questionnaires to be accepted and data captured as they arrived in the office. In the past, questionnaires were held until all were received and placed in geographic order, and processing followed the completion of all data-collection activities.

**Jersey City, NJ.** The Jersey City test compared the effectiveness of the two-stage collection method with the one-stage method used in 1980. The site was selected because it contained a substantial proportion of multiunit dwellings (88 percent) and a significant minority population (27.1 percent Black, 18.6 percent Hispanic, 4.4 percent Asian or Pacific Islander, and 0.1 percent American Indian), and a total of 223,532 population at the time, allowing

evaluation of the two-stage procedure in minority communities, which historically had been difficult areas to enumerate. There were a small number of places with special living arrangements, reducing the risk of complications arising from the enumeration of these types of places. Yet it was an urban site that appeared to be difficult to enumerate, and thus a good setting to determine if a two-stage census would be more effective than a one-stage enumeration. The collection office (as in Tampa) was managed by one of the Bureau's census field professionals and opened in October 1984 and closed in September 1985.

A split panel test was designed for two different methods, each enumerating approximately half the population and housing units in Jersey City. The experimental panel was the two-stage mailout/mailback, in which the mailout and nonresponse followup for the short-form (100-percent) data were completely separate from the mailout and nonresponse followup for the long-form (sample) data. The sample form re-asked the 100-percent items in all cases except for a small subsample (10 percent), where only the name of the resident(s) was re-asked. The control panel of the test was a one-stage mailout/mailback procedure similar to the Tampa test method.

The test was to address two questions: Compared with a one-stage collection method, would two stages speed the collection of 100-percent data; if so, at what cost in terms of money and quality of the sample data?

**Objectives and features common to both tests.** Objectives and features of the automation system being tested that were common to both test sites included sample selection from the ACF; collection office organizational structure; an address control file that allowed census office workers to geographically code addresses, to add and delete them, and to transfer addresses from one set of codes to another; and questionnaire workflow that allowed processing of questionnaires not in geographical order by computer hardware reading barcodes on each mail-return questionnaire and the keying of identification numbers from enumerator returns (concurrent processing). Following the automated bar code check-in of questionnaires, the system generated lists of addresses that required personal-visit followups.

The 1985 test saw the first use of concurrent processing. The increased use of automation made it possible to study the cost and timing implications of capturing data concurrently with data collection activities rather than waiting until all data had been collected. This was an important aspect of the automation scheme necessary to complete 1990 census processing in time to meet the legal deadlines. This was a substantial change from the 1980 census, in which data were not captured until the district offices were closed. The new system proved successful and enabled the test district offices to concentrate on data collection.

The questionnaires used included the 1980 census content except for items H-4 and H-13 (number of living

quarters at address and description of building, respectively) and new formatting to accommodate Postal Service and automation requirements. For the test, item H-13 was deleted and item H-4 was expanded into a single question; question H-4 now requested the number of "units in structure" rather than "units at address."

The tests began with the procurement of a commercial vendor's address list for each area and subjecting it to several phases of an expanded post office check. The first phase included two advance post office checks (APOC 1 and 2) by the USPS. During APOC 1, carriers reviewed the address lists for completeness. They identified undeliverables, missing, and/or duplicates of other addresses and corrected wrong address information. APOC 2 followed the first check and concentrated on those addresses declared undeliverable as residential addresses during APOC 1. To ensure that postal employees were checking these listings, they were "salted" with a small random sample of good addresses. The results showed that most carriers were accurately completing the second phase of the check, with only 1.3 percent of all carrier routes in the two pretest sites deleting everything on the list, including good addresses. The Bureau concluded that it would make no deletions from the census list based on the postal work, and thus decided that a second APOC would not be necessary.

Following APOC 1 and 2, a second phase had census enumerators do a unit-by-unit precanvass to verify and correct the address list. During this precanvass operation, the Bureau believed it also was possible to estimate the need for Spanish questionnaires, identify high crime areas, and determine potential hiring problems. The enumerators noted any unlisted residential addresses on cards. When these were geocoded—by use of census maps, local knowledge, precanvass results, and field visits by census workers—the entries were completed and the collection office keyed the addresses into the ACF. For any cases that could not be geocoded, the cards were sent to the processing office.

As a final phase, just prior to the mailing of the questionnaires, there was another USPS address list check, referred to as casing/time-of-delivery. During this check, postal workers "cased" the addresses using the labeled questionnaires and identified any additional missing addresses.

Both tests also examined the feasibility or necessity for new or revised followup techniques, such as—

- Nonresponse followup in the collection offices without access to the mail-return questionnaires (which the processing office received and checked in); with regard to this, the Bureau also looked at the transmission of the nonresponse listings to the collection offices.
- Capturing and providing surnames from the responses from multiunit structures, using the automated data files to generate lists for followup visits.
- Coverage improvement activities, including the followup of coverage edit failures and of vacant and deleted units.

- Initial attempts at telephone followup by the processing office for failed-edit cases; if not resolved, selected cases would be sent to collection offices for field followup.
- Some field reinterview for quality assurance and coverage evaluations after the pretest.
- Special-place enumeration for crews of vessels (Tampa only).
- The use of storefront<sup>40</sup> offices (Tampa only).
- Purchasing a residual telephone customer file (Jersey City only).
- For both mail- and enumerator-returned questionnaires, key capturing at least the first 8, and up to 14, characters of the surname and the initial of the first name of multiunit respondents into the automated system to assist in possible followup visits. (Bureau researchers also used the information to study matching techniques and undercount measures.)

With regard to local review and outreach for the test, the automated system produced preliminary housing-unit counts for local review before Census Day, as well as postcensus local review of population and housing unit counts. Promotion techniques were tested as appropriate for each site.

In June 1984, the Bureau decided to forego any special role for the State data centers (SDC's) in the test, especially in local review, feeling that their role in the census process needed further Bureau review and planning before implementation in a test.

There were two types of questionnaire assistance centers—telephone and walk-in—in both pretest sites. The walk-in centers were open in hard-to-enumerate areas typically from 8:30 a.m. to 5:00 p.m. and on occasion weekends, depending on the organization donating the space. Also, the collection offices in both sites assisted “walk-in’s.” Telephone assistance was available from the collection offices through a local assistance number that appeared on the label of all questionnaires in the initial mailout as well as in promotional materials. Reminder cards, containing the assistance number, were used only in Tampa, where they were mailed just prior to the start of the nonresponse followup to remind respondents to return their census questionnaires.

In June 1985, the Bureau decided to cancel the second-stage nonresponse followup for the two-stage test in Jersey City. At the time scheduled to cut off mail returns for the generation of nonresponse followup listings, the mail-response rate for sample questionnaires in the two-stage test was approximately half the rate (13.2 percent) found for sample questionnaires in the single-stage test area (25.3 percent). It did not appear that the quality of sample data from the two-stage followup would be improved, or

<sup>40</sup>A more convenient site, away from the collection offices, designated for meetings between enumerators and crew leaders to collect completed work and daily pay records.

even as good, compared with that in the single-stage area. Enumerators in the two-stage area would have to collect these data from over 80 percent of the long-form (sample) addresses, and that would take substantial additional financial resources. Furthermore, research had shown that data from mail-return households were of higher quality than those obtained by enumerators. The Bureau concluded that it knew enough about the two-stage census, and continuing with the second stage activities would not significantly increase that knowledge.

During an observation of the Postal Service processing in Tampa, Bureau staff discovered problems with the height and thickness of the long-form return packages. The conveyor feeding into the facer-canceler machine rejected the long-form return packages, thus requiring more manual sorting. The USPS's mail processing representative recommended reducing the height, thickness, and weight of the census mailing package.

Other problems included duplicate identification (ID) numbers within the questionnaire check-in system. Initial CO tallies projected 3,287 duplicates in Tampa and 1,278 in Jersey City, but a later tally on June 14, 1985, resulted in a count of 1,666 duplicates in Tampa and 2,218 in Jersey City. Sophisticated assignment control in the office would be required to eliminate or minimize this.

In June 1984, the staff decided to change the timing of the unit-by-unit prec canvass operation to begin in November 1984 rather than in mid-January 1985 as originally scheduled. The change allowed adequate time to include the prec canvass corrections on the label tapes for the initial mailout of questionnaires. The results of the unit-by-unit prec canvass showed relative success in fine-tuning the address list, especially in multiunit structures. (See table 1.)

The Bureau decided that the technology existed but the system requirements made the use of OMR technology infeasible for 1990. Results of the OMR testing were favorable; however, the forms were too constrained in size and could not hold answers to all the questions. Additionally, special temperature and humidity controls were needed to keep the hardware operating properly.

Automated check-in of questionnaires using the hand-held wand input device proved very successful and was again used in subsequent testing.

Reminder cards during the 1985 test proved very successful. Figures showed that the cards increased the mail response by approximately 4 percent, so they would be tried again in the 1986 test (see below). Also, improved management of field operations was seen in the Tampa site with the use of storefront offices (more convenient sites, away from the CO's, designed for meetings between enumerators and crew leaders to collect completed work and daily pay records). These proved to be an effective method of supervision by allowing crew leaders and enumerators to meet in a centrally located site close to work areas to review completed work and payrolls. This concept would be expanded in the 1986 test.

**Table 1. Final Results of the Unit-by-Unit Precanvass for Jersey City and Tampa**

Pretest site	Units	Total	Not changed	Transfer	Apartment designation correction	Other correction	Added	Deleted
Jersey City .....	Number	90,562	71,452	783	8,106	1,475	4,549	4,197
	Percent	100	78.9	0.9	9.0	1.6	5.0	4.6
Tampa .....	Number	123,866	88,086	1,475	1,439	21,431	8,778	2,657
	Percent	100	71.1	1.2	1.2	17.3	7.1	2.1

As part of the 1985 test and the idea that telephone followup of nonrespondents might be a possible cost-effective alternative to personal-visit followups, the Bureau evaluated the feasibility of purchasing residential telephone-number lists and computer-matching them to the address control file (ACF) to provide enumerators with nonrespondents' telephone numbers. The telephone numbers from such a file for the Tampa area were geocoded and matched to the ACF. The results showed that enumerators could have potentially accurate phone numbers for 43 percent of the nonresponse followup cases, and that it was feasible to add telephone numbers to the ACF by computer-matching telephone company and census files. However, practical considerations, ranging from the court-mandated breakup of the American Telephone & Telegraph Company (AT&T) to the anticipated shortage of computer facilities needed for concurrent census operations, dictated that followup enumerators rely on published telephone listings rather than a matched computer file. Telephone followup still would be an essential part of followup operations; therefore, it was further tested during the 1986 test in Los Angeles and staff evaluated the quality of data collected by telephone versus personal visit.

Surname keying proved successful in the field, but a few office problems surfaced, such as with many typographical errors and errors relating to keying negligence. The Bureau believed these could have been resolved, however, by providing clearer instructions that could be followed more easily, by giving more emphasis in training to the importance of the job and following procedures, and by providing refresher training for those showing performance deficiencies.

The expansion of the local review procedure from a mid-census review to both precensus and postcensus was successful in resolving discrepancies between the Bureau and local governmental units before final data were released. Jersey City officials, for example, challenged only nine blocks in precensus local review and none in the postcensus review.

Overall, the two-stage census test did not produce a significant improvement over the established one-stage methodology. Results indicated that initial response (short forms) in the two-stage method was about 0.5 percentage points higher than the short-form response rate in the one-stage panel; however, the sample response from the

two-stage was extremely low, at 15 percent. Further analysis also indicated that the quality of the two-stage sample forms would not be improved over the one-stage panel.

The overall mail return<sup>41</sup> and response rates for Jersey City and Tampa were as follows:

Test site	Response rate (nonresponse followup cutoff)	Response rate (final)	Return rate
Jersey City			
Two-stage—short form ...	32.6	39.5	44.8
Two-stage—long form ....	14.3	15.5	n/a
One-stage—short form ....	32.1	38.7	43.8
One-stage—short form/ long form.....	30.7	37.2	42.3
Tampa .....	47.2	55.6	62.9
Short form .....	49.2	57.6	65.0
Long form—keyed .....	39.7	48.6	
Long form—OMR .....	38.4	47.4	54.9

The 1985 test total cost was \$10,814,000.

### 1985 Chicago Special Survey

This was an informal test conducted in June 1985 to obtain information needed to design the race and Spanish/Hispanic-origin items for the 1986 National Content Test (see pp. 36-37).

The survey's objectives were to assess the feasibility of using the general category "Asian or Pacific Islander" in the race item of the census questionnaire and the general "Yes, Spanish/Hispanic" category in the Spanish/Hispanic origin item in the questionnaire. There were two short-form questionnaires, each containing seven population questions. The first form had the 1980 version of the race and Spanish/Hispanic-origin questions, and the second contained the revised version of these questions.

<sup>41</sup>In this publication, the mail-return rate is determined by dividing the number of questionnaires returned by the total number of occupied housing units. When calculated this way, the mail-return rate is generally considered a measure of public cooperation with the census. The mail response rate is calculated by dividing the number of questionnaires returned by the total number of questionnaires mailed out. Here, the numerator of the calculation remains the same, but the denominator includes both occupied, vacant, and deleted (or nonexistent) units.



The new version of the question incorporated the term “race,” and a general “Asian or Pacific Islander” category required respondents to write in their specific group. The new version of the Spanish/Hispanic origin question offered only two response categories: “No, not Spanish/Hispanic” and “Yes, Spanish/Hispanic (for example, Mexican, Puerto Rican, Cuban, Honduran, Venezuelan, Spaniard, and so forth).” Respondents were asked to write in the name of their specific group. Also, the second version included instructions for answering the race question.

The forms were mailed to a panel of about 2,000 households within selected areas of Chicago thought to contain substantial numbers of Asians and Pacific Islanders and persons of Spanish/Hispanic origin. Following the check-in of mail responses, a sample of households from each panel not returning a questionnaire was chosen for telephone followup.

A sample of mail-response households of each form type also was selected for personal visits by experienced Bureau field interviewers. These reinterviews were to provide indications of the differences in accuracy of reporting as “Asian or Pacific Islander” or “Spanish/Hispanic origin.” The test was not designed to provide rigorous statistical evaluation, but to assess results based on subjective information derived from a review of the item responses and personal observations of the reinterviewers, along with a comparative analysis of the data. Analysis of the returns showed that the short and the 1980 census versions had similar nonresponse rates and performed about the same in identifying the Asian or Pacific Islander population. The observations during the reinterviews of the short version suggested that most respondents understood the term “Asian or Pacific Islander.” Both versions were reevaluated (along with an additional version) during the NCT (see below).

## National Content Test (1986)

After gathering extensive recommendations from the major content-development programs described in the previous sections, the Bureau conducted a National Content Test<sup>42</sup> (NCT). The primary objective was to test new and revised question wording, formatting, and sequencing, based mainly on the recommendations gathered during the planning process (i.e., local public meetings, interagency working groups, Federal Agency Council, the Chicago Special Survey, and so forth). The analysis and evaluation of the NCT results provided a base of information for determining the final 1990 census questionnaire content and design. This was done through measuring the level of responses to alternative versions of questions and evaluating the consistency and validity of the data. One minor difference was the testing of the race question. Following recommendations from various planning conferences and other data users, the Bureau decided to test the word

“race” as part of the race question by including the 1980 census race item on two panels: one with the term “race” as the title and one with the 1980 lead-in, “Is this person—.”

There were three variations of 100-percent short-form questionnaires—designated as 1a, 1b, and 1c. Each contained the 1980 100-percent population items on relationship, sex, race, age, marital status, and Spanish/Hispanic origin. In addition, short forms 1a and 1b contained a multiple residence question (“Does this person regularly live at another residence for 30 or more days during the year?”).

The short-form housing questions included the 1980 topics concerning coverage, units in structure, access to unit, plumbing facilities, year built, tenure (whether owned or rented), acreage/use, value, and rent. Short forms 1a and 1b eliminated two components of the coverage questions used in 1980 and added questions on residential board and care facilities, number of bedrooms, and cooperatives. Short form 1c included the three 1980 coverage questions, a multiple-residence question completed for the household rather than separately for each person living in the unit, board and care questions, and a question on agriculture. All three short forms asked for telephone availability (as in 1980) as well as telephone number.

There were four content variations of long-form questionnaires; these generally contained the 1980 topics, supplemented with some new items. A fifth variation of the long form, with the same content as one of the other long forms but designed to look like a FOSDIC form, checked the effects of data conversion technology designed on mail return, item responses, and/or data quality. All other short- and long-form questionnaires were designed as key-entry forms.

Two types of questionnaire envelopes also were evaluated. The two envelope designs, one “commercial” (attractive and appealing) and the other, “official,” were tested across all the questionnaire versions.

A national sample of 46,000 housing units, designated for the NCT mailout, was supplemented with about 3,600 addresses with residential care, public housing, cooperative, or condominium status, to see if individuals could accurately self-identify their households as such.

Mailing packages were labeled and shipped on March 28, 1986, to the USPS for third-class delivery, 14 days later than the scheduled delivery date of March 14. The delay was in questionnaire assembly, where such things as the physical shape and thickness of the questionnaires caused the automated hardware to malfunction. The questionnaires had to be hand-inserted, adding about \$9,000 to the budget estimate.

Households were asked to mail back their questionnaires to the Bureau’s processing facility in Jeffersonville, IN, by April 1, 1986, the reference date for Census Day.

As the questionnaires arrived in Jeffersonville, they were checked in by a barcode reader (first used in the 1985 test) and sorted by an automated system, by form type. Data were coded, keyed, and controlled for quality on a flow basis. Approximately 3 weeks after Census Day, an address

<sup>42</sup>The title printed on the questionnaires was National Content Survey.



file was generated for a second mailing to nonresponse households (approximately 70 percent of the mailout). Mailing packages were labeled and shipped to the USPS for first-class delivery on May 1, 1986. A contingency plan (postmaster returns (PMR's) would not be included in a second mailing, and not all flagged cases would be subjected to second mailings if there were not enough return envelopes in stock) was discarded on April 16 after mail return numbers indicated the number of questionnaire packages on hand was adequate. Households received a letter from the Director urging their participation in the survey, and a duplicate of the original questionnaire that could be filled out and returned.

Check-in continued for 6 weeks, at which time field lists were generated for nonresponse followup. Then, for 7 weeks, between June 2 and July 18, a 25-percent sample, approximately 6,700 households and addresses determined by the USPS to be "undeliverable," was followed up with personal visits by experienced Bureau interviewers.

As a second phase of the test, reinterviews evaluated responses given to some of the items previously used. A subsample of approximately 40 percent, or 7,500 cases, of the mail returns was selected for reinterviewing, which ran for 9 weeks, from June 23 to August 22. In addition to these, households that identified themselves as lacking complete plumbing, using solar heat, or providing residential care were included in the NCT reinterview. That workload totaled approximately 500 cases. The reinterview forms also contained various versions of the race question used to aid reliability assessment of the race questions. (For more information on the development of the race question, see Chapter 14, "1990 Census Content: Population and Housing Items.")

As part of the planning for 1990, the Bureau decided that the length of the census questionnaire would be no longer than the 1980 version and that the total time spent filling out the questionnaire would not increase. If new questions were to be added, others had to be dropped. The NCT resulted in dropping the question on marital history and age at first marriage and adding those on total years of military service, the mobility and self-care limitations of disabled individuals, monthly condominium fees, and mobile-home shelter costs.

The NCT test total cost was \$2,735,000.

## 1986 Test Censuses

The second major operational tests were in several communities in central Los Angeles County, CA, and several counties in east central Mississippi; the latter site included eight counties and the Choctaw Indian Reservation. The areas were selected to provide both urban (Los Angeles—LA) and rural (Mississippi) situations for testing purposes. The main objectives in Los Angeles were: to test (1) a metropolitan processing office separate from the data collection office, (2) new or revised questionnaire content items and ways to improve the quality of data, and (3) the operations required to adjust census counts based on the

results of a coverage-measurement survey; and to develop and refine a wide-range outreach program. The main objectives in Mississippi were to test (1) a combined collection/ processing office concept in rural areas where recruiting and mail response rates were not as problematic as in urban areas for collecting and processing census data, and (2) address list compilation and questionnaire delivery methods in rural areas where mail delivery had historical problems; and (3) to develop better enumeration procedures on American Indian reservations. Additional objectives for both sites were to test improvements in mail response rates from mailed reminder cards and motivational inserts and to utilize automated data processing, as in the 1985 test.

The sites were chosen based on test objectives and additional criteria (e.g., budget considerations) set by the Bureau. The urban site had to have (1) a mixture of minority groups and other demographic and housing characteristics required to test questionnaire content and data quality, and (2) an area where there were enumeration problems in 1980, such as low mail return rates, late office closings, and recruiting difficulties. The staff chose a part of central Los Angeles County that had a population of approximately 370,000 at that time. The rural site needed to contain a whole American Indian reservation, a Southern location that experienced coverage problems in 1980, have a large proportion of non-house-number/street-name addresses (east central Mississippi contained 62.4 percent, based on 1980 addresses), and have a low population density to make it an ideal site for testing a combined collection office/processing office. The Mississippi site had a population of approximately 206,000. Additionally, both of these sites were recommended at a meeting of the four 1990 Census Advisory Committees.

In Los Angeles County, two district offices conducted the census operations, one in the northern section (Bell) and one in the southern section (Compton). The offices opened in December 1985 and closed in August 1986<sup>43</sup>. In Mississippi, the Meridian district office opened in December 1985 and closed in September 1986. Census Day was March 16, 1986.

The temporary staffs in these district offices, including the district office manager (DOM), were paid hourly. Employees working in California received a slightly higher hourly pay rate than those in Mississippi due to the higher cost of living and more competitive labor market associated with the Los Angeles metropolitan area. Also, crew leaders and enumerators were eligible for incentive pay in addition to their regular pay during nonresponse followup (NRFU). Enumerators earned a bonus of \$50 (Mississippi) or \$75 (Los Angeles) upon the successful completion of NRFU training, acceptance of a first assignment, and turning in 10 completed cases that passed review. Crew leaders and enumerators were both eligible to earn bonus money

<sup>43</sup>Due to poor mail response in the southern section, the Bureau decided to close the Compton office at the end of March 1986. See p. 40.

based on the number of completed cases (quantity and quality) turned in to the district office (see below).

In January 1986, preliminary housing unit counts were sent to local government officials in Los Angeles and Mississippi for a precensus review of the counts. Census enumerators recanvassed discrepancies during the month of January and changes were incorporated into the automated address control file prior to the post office checks and questionnaire mailout (see below).

As mentioned above, mailout/mailback was the primary enumeration technique in the LA sites. To better ensure completeness, the commercial address list for that area underwent a series of checks by enumerators and the USPS just prior to mailing: precavass by census enumerators and two USPS casing checks—casing and time-of-delivery—using the actual questionnaires.

During the first check on March 6, postal workers “cased” addresses and identified missing addresses by indicating the results on address cards (form DC-722) called “blue cards,” deleted undeliverable addresses, and corrected others. The completed blue cards were stored with the questionnaires until the second check, during the time of delivery, 2 days before Census Day. At this time, postal carriers identified any additional changes. These two operations were combined in the 1985 test, but were separated in the 1986 census to see whether two checks would be better than one.

On March 14, approximately 110,000 questionnaires were mailed to respondents and the blue cards were sent to the processing office<sup>44</sup> for geographic coding, updating of the automated address control file (ACF), and labeling and mailing of questionnaires.

In Mississippi, the address list was compiled in a “prelist” operation in which census enumerators traveled assigned areas, annotated maps, and recorded mailing addresses, location descriptions (if appropriate), and relating information for all units where people lived or could live. Census enumerators prelisted a total of 79,450 addresses. A split-panel test was designed in which the USPS delivered questionnaires in one half of the ARA’s in the test area and census enumerators delivered them in the other half. The prelisted addresses for the USPS delivery were submitted for carrier checks at the same time as those for LA.

The second method of mail enumeration studied in Mississippi was an exploration of a more efficient way to contact living quarters in rural areas that lacked house-number and street-name mailing addresses. In this procedure, referred to as “update/leave,” enumerators canvassed assigned areas between March 3 and 14, updated registers containing the prelisted addresses, delivered the appropriate type of questionnaire for respondents to fill out and mail back, and corrected and updated the census maps as necessary. The Bureau hoped this method might be more advantageous than the traditional USPS delivery,

since address-list requirements would be simpler and address-list updating could be done during the questionnaire dropoff. Additionally, early contact between residents and a census representative could improve understanding and cooperation. After comparing the method in terms of cost and accuracy, the staff was pleased with the results and scheduled additional testing of the procedure during the 1988 dress rehearsal.

An additional testing impetus for the rural area was to evaluate improved techniques for enumerating American Indian reservations. One of these was the implementation of the Tribal Liaison Program; the purpose here was to improve working relationships between the Bureau and the tribes through the use of liaisons. These were people appointed by tribal leaders to work with the local census office on such activities as outreach and enumerator recruitment. The program established effective working relationships with each tribe for enlisting cooperation of its members, recruiting applicants from the reservation for all levels of jobs, clarifying or translating during training sessions, and serving as the local-review contact for the tribe. Evaluation of the program showed that it was effective and that certain improvements in future tests would make it even more so.

Before the test, the Bureau experimented with portable computers in collecting addresses and related data. The experiment in Jones County, MS during July-September 1985 compared enumerator productivity, address list quality, and completeness with the traditional prelist procedure. The test used two independent staffs of 20 enumerators, one group with laptop computers and the other using the traditional listing method (an address register and a pencil). The automation results were positive; the group using portable computers was able to collect over 28,000 addresses during the 4-week period, as compared with just over 24,000 addresses collected for the same geographic area under the “traditional” procedures. The automation did not adversely affect interviewer production or data quality. The cost per listing was similar: \$0.77 per listing for the automated and \$0.82 for the traditional procedure. Additionally, coverage evaluation showed both procedures identified better than 90 percent of the estimated total addresses. A decision not to use the portable computers nationally during the 1990 census was primarily based on the cost of the equipment. However, there were plans to reevaluate the idea for the 2000 census.

New technology for map production was evaluated in this test. Maps were generated by computer for the first time and printed on electronic plotters. (The test included using a commercial material believed to be durable and maintainable in a “field” environment with constant handling by census workers. This was not successful; the emulsion turned pink and flaked off.) Street designations on the maps were defined with double lines (as opposed to single lines used in past censuses) to make the maps more comprehensible and to assist enumerators in canvassing and map spotting; however, the decision was made that single-line roads would be used in future operations.

<sup>44</sup>The processing office was set up in the Federal facility at Laguna Niguel about 35 miles away. (There had been a census processing office here in 1980.)

The 1986 test census questionnaires included a "motivational insert" designed as an appeal for cooperation in the census and an increased mail response.

The insert was evaluated by randomly selecting half the addresses from the automated address list and designating those to receive the insert; the other half was the control. The flyer was printed in vivid colors and the messages, in both English and Spanish, were designed to (1) describe the purpose of the census and the benefits of voluntary participation; (2) provide information on confidentiality of answers; and (3) push respondents over the hurdle of simply getting started filling out the form. The staff developed the insert with assistance from the Direct Marketing Association. The results showed that in both test areas the insert had significantly positive effects on mail response for both short and long forms. Overall mail response rates were higher by 3.1 percent and 1.0 percent for Los Angeles and Mississippi, respectively, for areas receiving the motivational flyer. This appeared to be an inexpensive way to improve mail response rates, but due to wording disagreements in the 1988 dress rehearsal (see below), the insert was not tested again and was subsequently dropped in 1990.

Following their successful use in the 1985 test, separate mail reminder cards, designed to motivate and encourage greater mail response from the public, were tried again in 1986. Expanding on the one-wave test in 1985 with the idea that two reminder cards might affect response rates more than a single mailing, the first wave of cards (175,000) was delivered 6 days after Census Day to a sample of households identified as nonrespondents as of March 19 (3 days following Census Day). On March 29, the second wave, 75,000 cards, went to those wave-one sample households that still had not responded by March 25. Premature closing of the south Los Angeles city collection office (see below) affected analysis of the reminder-card response rates. The Bureau used a split-panel design to evaluate the effects of the cards. The addresses were divided into three panels, two treatment and one control. The control panel received no reminder cards, and the two experimental panels received one and two waves respectively. The results of this study are discussed below.

In Mississippi, mail reminder cards for the USPS questionnaire delivery panel were delivered on the same schedule as in LA. For the update/leave panel, the reminder cards were to be delivered on March 14 (at the same time the USPS was delivering questionnaires). The plans called for a March 6 USPS casing check that included address cards and the reminder cards. The purpose for including the latter in the casing check was to prevent unnecessary generation of blue (address add) cards, which would require field visits to verify before updating the address control file. The USPS, however, mistakenly delivered approximately 40 percent of the update/leave reminder cards during the week of March 3. Most of the households that received the cards had not received their questionnaires, as enumerator delivery only began on March 3.

The collection and processing office received a substantial number of telephone calls from reminder card recipients inquiring when a form would be delivered. Consequently, the Bureau decided to cancel the March 6 casing check. It instructed the USPS to return all update/leave reminder cards not delivered, and printed and labeled an additional set of reminder cards for use during the March 13-14 casing/time-of-delivery checks. A second set of cards was sent to nonrespondents in Mississippi on March 26. In both areas, the second set reminded the respondents to mail their forms or call an assistance number listed on the card and provide the information by telephone. This was to encourage the use of telephone interviewing.

An outside advertising agency aided in promoting the 1986 test. Specific themes were developed for the different sites and promoted through a mass-media campaign of television and radio public announcements, billboards, various posters, flyers, and so forth.

The community awareness program, with the help of local leaders, was oriented towards local community organizations. Briefings were set up with Bureau outreach staff and local representatives to discuss the test plans and encourage cooperation. Also, there were awareness programs for religious communities and schools. Meetings with appropriate leaders helped promote the census through these channels.

Employee recruiting was done through consumer-oriented campaigns utilizing television, radio, and classified advertising, especially in minority and neighborhood publications.

The test, with the aid of the automated system, saw the creation and maintenance of a computerized applicant file. This system was very efficient in allowing easier employee recruitment and helped assure that the people hired to work in particular areas also lived in those areas. The system also allowed production of daily automated management reports to assist in supervising all district office field and office activities. The reports gave supervisors a daily summary, along with a total summary, of field costs and enumeration progress. The reports "flagged" poor production or high-cost reporting by census workers and alerted supervisors to possible problems. This type of management system had never been used before in census operations and proved extremely successful in keeping them running smoothly and on time.

The overall mail response rates in both the LA and Mississippi test sites were lower than expected, at 34 percent and 56.7 percent, respectively. The effects of the reminder cards on these rates were similar in both areas; however, a formal evaluation was conducted only in LA. The use of two mail reminders, as opposed to one, did significantly increase the response rates. In LA, the mail response rate of nonresponse households as of March 26 (10 days after Census Day) was 7.4 percentage points higher than the control panel (areas not receiving the reminder) for the two offices. The second card yielded even higher percentages (3.6 additional percentage points) for

the two offices. The increase in mail returns in the reminder-card panels was higher in LA than the increases found in the same study during the 1985 test in Tampa. The LA results indicated that two reminder postcards could decrease followup costs in the 1990 census. (Due to logistics and cost, only one set was used in 1990.)

Questionnaires returned by mail for the LA test area were received in the Laguna Niguel processing office, while those from Mississippi were received in the collection office in Meridian. After arriving in either place, the questionnaires were checked in against an automated master list of addresses and then submitted to a series of clerical edits to identify errors on the forms. Failed-edit questionnaires were followed up with a telephone call by census office workers to eliminate expensive personal visits by enumerators to resolve minor errors.

On March 27, 1986, the Bureau decided to cancel the test census activities of the Los Angeles County South collection office in Compton, as mail response was well below the Bureau's expectations throughout the entire Los Angeles test area. When mail from the public began to level off 2 weeks after Census Day, past experience indicated that not many more returns could be anticipated. The expected mail response rates for Los Angeles North and Los Angeles South were 50 percent and 45 percent, respectively. As of the decision to cancel on March 27, the rates were 31.3 percent and 24.1 percent, respectively. Limitations in outreach and publicity probably contributed, even though well organized (see above); the sites were small, isolated spots within a large marketing area and therefore received scant attention from the major media. Further, many households—particularly those that were hard to enumerate to begin with—either did not receive questionnaires or had trouble completing them.<sup>45</sup> Because of this extremely low response rate, it was clear that the available resources were insufficient to complete the test. Further, residual resources in the southern office had to be reallocated to the northern office in Bell to complete the test there. Contingency planning had recognized the possibility of dropping one of the Los Angeles offices if the mail response rates were extremely low. Expecting this, the Bureau concentrated in the north office on several key sub-populations (such as the large number of Asians and Pacific Islanders) vital to 1990 planning.

The 1986 test evaluated several followup procedures. One of the experiments dealt with using telephones, rather than personal visits, to contact nonresponse households. (Heretofore, telephone followup had been limited to incomplete returns.) This operation was successful in reducing the number of personal visits, the costliest operation associated with a census. Enumerators also were encouraged

<sup>45</sup>The Bureau's Census Community Awareness Program (CCAP) staff conducted a general population survey (GPS) of 2,250 households to investigate the poor mail response. The results showed 27 percent of the GPS respondents did not receive a census form. Also, of those reporting receiving a form, 88 percent opened the envelope, but only 58 percent started to fill it out. (1986 Test Census, Preliminary Research and Evaluation Memorandum No. 9, May 2, 1986.)

to phone before they visited such cases, contributing to the cost effectiveness of the procedure. They obtained phone numbers from directories or other knowledgeable respondents.

Another procedure designed to help nonresponse enumerators maximize their productivity was the use of appointment cards after the first visit to a nonresponse household when no one was home. The card had space for the enumerator to enter his/her name and phone number; the respondent was asked to telephone the enumerator to make an appointment. If the respondent called, the enumerator attempted a telephone interview. If after 2 days the respondent did not call, the enumerator made another personal visit. The results showed a total of 1,807 nonresponse cases in LA and 1,411 in Mississippi were completed by telephone. Of these households, 10.6 percent and 26.5 percent, respectively, were telephone cases where an appointment card was left. Based on these numbers and an attitude survey conducted in LA and Mississippi regarding the appointment card, the Bureau concluded it was a necessity for 1990. The card also gave the enumerator the advantage of notifying the respondent that a census taker had visited his/her home. In both Mississippi and LA, 76 percent of the enumerators thought the appointment card was a good idea.

Additional followup techniques evaluated included use of storefronts, large-group motivational training, and incentive payments for meeting certain criteria.

Storefront office space was successfully used during the 1985 test in Tampa and led the Bureau to further evaluate it in the Los Angeles test site. The original plan there called for four storefront offices; however, the closing of the Compton area left only two for evaluation. The staff believed that the extra facilities might allow for timelier data collection, better control of costs and enumeration, less enumerator turnover, and/or possible cost savings. The results indicated that the costs (based on a per case figure for storefront versus non-storefront) for the storefront areas were substantially higher than non-storefront areas. Also, turnover was similar and there was no difference in the completion time of the operation in either area. However, finding suitable sites to meet the requirements necessary for storefront offices was a considerable problem. Given the inherent difficulties experienced in this test, it was decided not to pursue the use of storefront offices in the future.

In Los Angeles, the Bureau evaluated an orientation (motivational) training session for nonresponse followup enumerators. The sessions involved gathering 200 to 4,000 enumerators in a single location for about 2 hours before standard classroom training, in an attempt to build commitment and motivation toward the census. It was hoped that the sessions would lead to a more dedicated work force, higher quality work, and lower turnover. Activities included welcoming remarks from a local Member of Congress and several audiovisual presentations. In evaluating enumerators' performance in nonresponse followup, the session appeared successful in improving attitudes

regarding the confidentiality of census data, the value of the census questions, and the importance of the 1986 census. However, the logistics (e.g., checking in participants and securing projection and sound equipment) and costs (such as the participants' travel) associated with nationwide implementation of the program during the 1990 census were not feasible, and therefore the idea was dropped.

An incentive pay premium (as mentioned earlier) for nonresponse followup enumerators worked well in LA and Mississippi. Enumerators and crew leaders were entitled to a bonus payment for the completion of training and additional bonus pay for the number of acceptable cases completed. Based on evaluations of several operational components (including employee turnover rates and exit interviews with enumerators and crew leaders), the incentive proved successful in the timely completion and reduction in total cost of the operation.

The 1980 census had used a "Nonhousehold Sources Program" that attempted to improve urban within-household coverage by clerically matching names, addresses, and basic demographic data from independent lists (e.g., drivers' licenses or draft registrations) to the census. Persons not found in the census were followed up. The results had not been encouraging, but it was thought that the program still might have merit if automated procedures could be used. Accordingly, the program was tried again in LA. The results concluded that it offered no greater coverage improvement gains or cost improvements than it had in 1980. Additionally, operational problems (such as not adding persons due to list problems associated with multiunit structures) that reduced the effectiveness of the 1980 program were observed, and did not appear to be solvable for 1990. This was the only test of the Nonhousehold Sources Program during the 1990 planning cycle. Since this program failed to improve coverage significantly, it was not implemented in 1990.

An expanded local review program was tested in the 1986 pretest by including, for the first time, workshops in advance of the census to explain the review process to local officials and to teach them how to prepare for it.

Procedures were refined for furnishing respondents with Spanish-language questionnaires, and multilingual persons were available to assist foreign-language-speaking respondents.

Another important objective was to determine the feasibility of timely coverage-measurement studies, which would be needed if the 1990 census results had to be adjusted for an undercount. Testing of adjustment-related operations included several new procedures. Two alternative measurement techniques were tested in Los Angeles: the pre-enumeration survey (PrES) and the post-enumeration survey (PES). In the PrES, crew leaders and enumerators worked outside their assigned census areas to list and interview at selected housing units; those questionnaires then would be matched to the test census itself to see whether any of the housing units and persons living in them had been missed (and thus have to be contacted and enumerated). Evaluation found that while having different

canvassers than the ones in the test preserved the PrES's independence, it was difficult to match them to the areas they had to visit in terms of language, race or ethnicity, etc. Further, there were other precensus reviews, such as the address checks. For the PES—an independent survey to be matched to test census records after census operations were completed—the staff was able to recruit from the best of the experienced enumerators, who in this instance tried using laptop computers during their interviews.<sup>46</sup> Based on the results of this testing, the Bureau decided to use a PES in 1990 for estimating an undercount. With estimates and statistical techniques, adjustments and changes could be made to the census if necessary. (See ch. 11.)

The 1986 test total cost was \$19,744,000.

## 1987 Test Census

The third full-scale test census took place in 10 counties in north central North Dakota and included the Fort Totten and Turtle Mountain Indian Reservations. The approximate population size of the test area was 75,000. The reservations contained 3,500 and 6,900 inhabitants, respectively. In attempting to improve the 1980 procedure of using the conventional, door-to-door enumeration techniques for this type of sparsely settled area, this test assessed the feasibility of a mailout/mailback census in small towns and small cities, referred to as "prelist pockets," embedded in conventional enumeration areas. Other objectives and innovations tested included: (1) additional testing to define the role and activities for the American Indian "tribal liaison" in helping to promote the census on reservations; (2) refining procedures for enumerating sparsely populated areas; (3) mailing out questionnaires 9 days before the Census Day of April 5; (4) using an enumerator-friendly questionnaire for personal-visit followup formatted differently than that used in the initial mailout; (5) testing the ability of a district office to handle two enumeration procedures, as related to management, control, and workflow; (6) further assessing supplemental and incentive pay for enumerators and crew leaders as it related to productivity and hours worked; and (7) testing the use of telephone callbacks for enumeration.

The test began in July 1986 with enumerators compiling mailing lists (using prelist procedures) for seven towns and their vicinities within the 1987 test area. The district office, located in Devils Lake, ND, was first opened for 2 months (June to August 1986) for the prelist operation.<sup>47</sup> An important facet of this prelist operation was its reliance on the TIGER (Topologically Integrated Geographic Encoding and Referencing) System (for additional information, see ch. 3), especially to identify the specific areas covered by the process and to provide maps of each area for census staff, USPS, and local review.

<sup>46</sup>Cf. 1986 Test Census Preliminary Research and Evaluation Memorandum No. 54, n.d.

<sup>47</sup>The official opening of the office was in January 1987. The office remained open until the test was completed in September 1987. During the interim between the prelist and the start of census operations, the office remained under lease by the Census Bureau, but was not staffed until January 1987.

The 1987 test workload was 34,833 housing units, of which 22,616 were enumerated using the conventional methodology, the balance by mailout/mailback. The district office staff consisted of locally hired employees, with five full-time positions—one office manager, three assistant managers (for field and office operations and for administration) and a recruiting operations supervisor.

The mailing lists for the “pockets” were developed by enumerators from June 28 to July 25, 1986. During this operation, they systematically canvassed assigned areas, annotated their census maps, and listed on a blank register the address, location description (if appropriate), and related information for each living quarters. The addresses were keyed into the collection control file (CCF)<sup>48</sup> in the collection office. Following that, address lists were printed and submitted to three USPS checks (advance, casing, and time-of-delivery) prior to the mailout to identify additions, deletions, and corrections. The original plans for 1987 included a precanvass (i.e., verification of an existing mailing list) by census enumerators for these areas, but this was dropped when the decision was made on April 15, 1986, that pockets of mail areas within conventional office boundaries would not be precanvassed for the 1990 census.

Questionnaires were mailed out on March 27, 1987 (to be returned by Census Day, April 5, 1987), in plain brown envelopes instead of the commercially designed ones used in the past. This style did not appear to drastically improve or degrade the mail-response rate. Mail reminder cards were again tested successfully (as in 1985 and 1986) and mailed on April 3, 2 days before Census Day.

It was believed that early questionnaire delivery might be more advantageous than the standard practice of delivery 2 days before Census Day. Experience in the 1985 and 1986 tests suggested that respondents were taking more time than in earlier censuses to fill out and return questionnaires. The additional week was used to prepare for the automated check-in of mail returns and mount a full-scale publicity campaign.

The 1987 test again used (as in 1985) a self-mailing package to distribute the 100-percent questionnaires (sample questionnaires were to be returned in separate envelopes). The self-mailing package, made up of the questionnaire, instruction guide, and a two-way envelope for easier respondent mailing, was printed, folded, and labeled for mailing by the time it reached the end of the printing process. Although the self-mailer was not formally evaluated until the 1988 dress rehearsal census (see below), it did appear to be both cheaper and faster to produce.

This test was the first opportunity for the Bureau to evaluate refined coverage improvement procedures and automated check-in for conventional enumeration areas, referred to later as “list/enumerate” (L/E) areas. In the

1980 census, 4.5 percent of the U.S. population had been enumerated using the conventional method. The major methodological differences between this test and the 1980 census were—

- The crew leaders’ advance listing (March 6-18, 1987, prior to the enumeration) of a sample of addresses that they later compared with completed enumerator work as a measurement of the quality of enumerator listings) was more decentralized and on a much larger scale. In 1980, only a small sample was taken and the listings were compared in the district office.
- An office edit of all questionnaires, in contrast to only a sample in the 1980 census.
- Telephone followup of all failed-edit cases, if possible; in 1980, there was no such telephone followup.
- Preliminary housing counts and population in group quarters for review by local officials were obtained manually for enumeration districts<sup>49</sup> by office clerks from the address registers in 1980; in 1987, the same counts were available from the automated CCF.

The L/E method had mail carriers deliver advance census reports (ACR’s), each with a simplified address (“Residential Customer-local”), to approximately 20,000 housing units, on March 27, 1987. Respondents were asked to complete the questionnaires and hold them for pickup by an enumerator between April 4 and May 9. An enumerator visited the residence, listed the address on a listing page, marked the residence on a census map, and collected the completed questionnaire or filled out a fresh, “user-friendly” questionnaire. At predesignated households (based on the listing pages), they transcribed the short-form information onto a long-form questionnaire and completed that with additional responses. A new procedure was evaluated for respondents not at home during an enumerator visit. If no one was home, the enumerator tried to obtain a surname from a mail box, neighbors, and so forth, and attempted a telephone followup. If this was not successful, there was another visit. Last-resort (minimum information accepted) information was obtained only after the enumerator made three phone calls and two personal visits and was unable to obtain an interview.

Questionnaires returned by mail to the district office were checked in against the CCF using an automated wand that electronically read a preprinted bar code (containing codes that identified the housing unit on the CCF), as first tested in 1985. The questionnaire was then submitted to a series of edits to identify errors. Clerks tried to resolve failed-edit cases by a telephone followup; if not, the questionnaire had to be assigned to an enumerator for a personal revisit.

Enumerator-filled questionnaires were also edited for content and coverage. Failed-edit cases were sent to telephone followup (all mail-return telephone followup cases

<sup>48</sup>The CCF was a series of programs and files used to track the progress of major census operations. The CCF contained geographic codes, identification numbers, and other identifying information for all living quarters in the area.

<sup>49</sup>“Address register areas” in the 1990 census.



that could not be resolved after four attempts were sent for field followup (see below)). Each completed case's identification information and population number were keyed into the CCF for address-file updating.

Just prior to and in preparation for field followup, there was a two-stage operation, called "merge," as coverage assurance for L/E. During the first stage, clerks compared completed questionnaires to the L/E address registers and identified missing, incorrect, or duplicate questionnaires. Missing cases were referred to field followup. During the second stage, the clerks compared the L/E address registers to a CCF printout (containing a listing of the questionnaires actually accepted and data-captured). Discrepancies were annotated for checking by field followup enumerators.

Special procedures were used for population groups whose living arrangements were different from the usual types of residences (houses, apartments, and trailers). These "special places" included college and university dormitories, hotels, motels, hospitals, prisons, nursing homes, military installations, etc. Special-place enumeration operations in the test site started with 37 special places from the Bureau's master list of them. The test list was checked and updated several times (during the prelist operation, the APOC, the L/E operation, and from the local knowledge of district office workers) before using it in the enumeration phase; the final special-place inventory was 47 places. The special-place enumeration consisted of a prelist operation (February 4-13) in which enumerators traveled to all known special places and classified the associated living quarters as group quarters (GQ—living quarters occupied by 10 or more unrelated persons; if less than 10, these places were classified as housing units) or housing units (HU's). The HU's identified by this operation were included in the regular enumeration. Group quarters enumeration began the day after Census Day and continued for 2 weeks. During that time, enumerators visited the group quarters, listed the names of the people staying there, and enumerated them on individual census reports (ICR's); these forms contained the population questions, but excluded the housing questions, on the regular questionnaires. Special procedures also were used to count populations at hotels, motels, and tourist homes in operations referred to as "T-Night" and "M-Night." T-Night, on April 4, covered people residing in hotels, motels, and tourist homes charging more than \$12 a night. M-Night, on the evening of April 13, was for those residing in hotels, motels, and tourist homes charging \$12 or less per night. It also covered flophouses, jails, detention centers, and missions.

The promotional campaign for the 1987 test, including an educational project for the school system, was refined to reflect 1985 and 1986 test experiences.

Several other coverage improvement operations were tested in North Dakota. These included pre- and postcensus local review, which involved the review of census counts by local officials before and after the test. (The precensus address counts, by blocks, were from the prelist operation, and local officials were given reasonable time to

identify discrepancies. The postcensus block-level housing-unit and group quarters population counts were produced for all governmental units from the automated system and delivered after the completion of all the regular field work and corrections. Local officials had census maps of their jurisdictions, showing the census blocks, to assist in their review.)

Other coverage-improvement operations included a vacant/delete check and a post-enumeration post office check (PEPOC), which the USPS conducted from June 8-19, 1987. This was a primary coverage-improvement operation for L/E areas, but in 1987, it also covered the prelist pocket areas to help the Bureau evaluate the two-procedure collection methodology. The PEPOC operation was similar to the APOC in that postal carriers cased address cards to further identify missing or duplicate addresses. They completed a Post Office Report of Missing Addresses (blue card) for each residential address identified as missing, and identified duplicate and undeliverable address cards, although the main thrust was to identify missed residential addresses. If the district office determined that the unit was a "true" add, then an enumerator was sent to fill out a census questionnaire, geographically code the unit, and add it to the appropriate address register. Coverage gains were small compared to cost, and led ultimately to dropping PEPOC from the 1990 census. (See p. 51.)

An additional innovation in 1987 was the use of a callback record, form DF-104E for L/E areas and form DF-103C elsewhere. The appropriate version was bound into each assignment register at the end of the housing-unit list. Enumerators recorded each housing unit requiring a return call or visit on a line of the callback record and, if possible, completed the interview by telephone. Using these records as indicators, over 41 percent of the callback cases for L/E had phone numbers listed, but only 14.3 percent were completed by phone. In prelisted areas, only 29.6 percent had telephone numbers, but 33.8 percent were completed by phone. The inconsistencies suggested that enumerators failed to make complete entries on the callback records. Training packages for 1990 were adjusted to include additional training on this form's proper use.

Followup activities were in two phases: nonresponse followup (NRFU) for the mailout/mailback portion only and field followup (FFU) for both the mailout/mailback and list/enumerate areas.

NRFU took place from May 7-30, 1987, with a workload of 3,185 cases. Questionnaires were supposed to be returned by Census Day (April 5), but were actually received and accepted for 19 days after that. On April 24, address lists were printed for prelisted units for which the district office had received a questionnaire. Enumerators used the address lists and census maps to locate and make personal visits to the nonrespondents and collect a completed questionnaire. The procedures were nearly identical to 1986 with only minor modifications. The changes included the use of the "enumerator-friendly" questionnaires and callback records. Enumerators used "refusal records" and

“deletion records” to report respondents refusing cooperation and nonexistent units, respectively. Crew leaders attempted to resolve refusals. Questionnaires returned from the NRFU were keyed into the CCF.

FFU with a workload of 5,790 addresses, was carried out from June 22-July 10. This operation took place after nonresponse followup or list/enumerate for the purpose of fieldchecking vacant and deleted units (and enumerating them if this information was erroneous) and enumerating missing cases from the merge operation and failed-edit cases.

The 1987 test total cost was \$7,783,000.

### **Special Urban Survey (1987) and Focus Group Interviews**

Following the inconclusive nature of the results from testing the race and Spanish/Hispanic-origin questions in the 1986 and National Content Tests, a Special Urban Survey (SUS) in late June 1987 further refined and analyzed the race question and alternative versions of the Spanish/Hispanic-origin question.

The survey measured mail response and questionnaire nonresponse rates. The SUS sample had approximately 27,000 housing units designated for a two-panel mailout, 1A and 1B, selected from 1980 census address listings. The mailout was in six metropolitan areas (Los Angeles-Long Beach, San Francisco-Oakland, and San Diego, CA; Houston, TX; New York, NY; and Miami, FL) known to contain significant Asian or Pacific Islander (API), Cuban, Mexican, or Puerto Rican populations. There were two short-form questionnaire versions (13,500 to each panel).

The SUS questionnaire content was defined in March 1987. The two questionnaire versions were based on past experience (NCT and 1986 and 1987 tests); both contained identical racial categories but differed in instruction wording and in the number and placement of API examples. The Spanish/Hispanic-origin question was refined and the respondent was now given explicit instructions to fill a “Yes” circle if Spanish/Hispanic or a “No” circle if not. The objective was to measure differences (if any) in the completeness and consistency of reporting.

Questionnaires were printed in May following Office of Management and Budget (OMB) approval. The mailing packages were shipped to the USPS for first-class delivery on June 17, 1987, with Census Day on June 22. Households were asked to respond by mailing their questionnaires to the processing office in Jeffersonville, IN, by then.

Following the receipt of the questionnaires in the processing office, a second set of mailing packages was labeled and shipped to the USPS on July 15, 1987, for delivery to nonrespondents. This second mailing consisted of a letter from the Bureau director urging participation in the survey, a duplicate questionnaire, and a return envelope.

About 6,000 mail-response housing units (3,000 per panel) were visited in a reinterview procedure to assess the accuracy of reporting in the questionnaires, such as the

consistency and validity of item responses, and alternative versions of question wording and design. The procedure lasted for 7 weeks, from August 3 to September 22, 1987.

This was the final test for analyzing and finalizing the wording and response categories for race and Spanish/Hispanic-origin questions. The results showed that both SUS questionnaire versions performed about the same with respect to overall nonresponse rates. There was a slight difference in the reporting (panel 1B had a higher percentage than 1A) of detailed API groups for people writing in a Southeast Asian group, such as Vietnamese or Cambodian. In contrast, panel 1A had a higher percentage writing in a group such as Amerasian, Indochinese, or Nepali classified as “Other API.” It also revealed that a few respondents interpreted a “Laotian” example to be “Latino.” Regarding the Spanish/Hispanic-origin question, results showed the short version (yes or no to Spanish/Hispanic origin) produced a lower nonresponse rate; therefore, the decision was made to use this version in the dress rehearsal.

Following this survey, a series of focus group interviews in September and October 1987 sought to determine if the terminology and instructions for the race and Spanish/Hispanic-origin questions were understood by small groups concentrated in certain areas of the country: Asians and Pacific Islanders in Hawaii (Honolulu, with separate focus groups for Asians and Pacific Islanders on September 10 and 11, respectively); Eskimos, Aleuts, and Alaska Natives in Alaska (cities of Anchorage and Bethel, on October 15 and 17, respectively); Spanish/Hispanic-origin persons in Texas (El Paso and San Antonio, September 22 and 23, respectively); and Blacks and Whites in West Virginia (Charleston, September 24). Fifteen people were recruited for each group, with an average of 8-10 actually participating. The Bureau contracted with private firms experienced in focus-group interviewing to moderate the sessions.

By mid-January of 1988 the Bureau had to decide on the exact wording of the “new” race question and the Spanish/Hispanic-origin question to be used in the 1990 census. (For more information on this test, see Chapter 14, “1990 Census Content: Population and Housing.”)

The 1987 Special Urban Survey and focus group interviews’ total cost was \$772,000.

### **1988 Dress Rehearsal**

The purpose of the dress rehearsal program was to test all the various operations planned for the 1990 census to ensure that they would actually work in a full-scale enumeration. Four years of consultations with data users and formal tests of alternative procedures and questionnaire content led to the dress rehearsal, following which only materials and procedures that did not appear satisfactory would be revised for 1990.

A number of criteria were considered in planning the dress rehearsal program. It was believed that—

1. Every major type of district office planned for the 1990 census—type 1, type 2, and type 3—should

be included in the dress rehearsal.<sup>50</sup> One reason for this was to aid in preparing procedural manuals and training guides for each type of office. Type 1 offices were chiefly in large urban areas where a mail census would be based on an address list purchased from a commercial vendor. Type 2 offices were mainly in urban and rural areas where a mail census would be based on an address list compiled by census workers and purchased vendor lists. Type 3 offices were concentrated in rural areas where the door-to-door method of enumeration would be used primarily.

2. Every operation planned for the 1990 census should be conducted in the field during the dress rehearsal.
3. The type 1 and type 2 district offices should be contiguous, so that there would be an opportunity to learn something about problems encountered when two offices operate adjacent to each other. e.g., promotional efforts, post office operations, and recruiting.
4. The district offices should operate with full management staffs.
5. The district offices should operate under regional office control without direct intervention from headquarters.
6. There should be a "pyramidal" training program, similar to the one used in the 1980 census and planned for 1990: The headquarters staff should train regional coordinators, who in turn would train district-office management personnel; the latter would train first-line supervisors, who would train production employees. All training would use verbatim instructions to ensure consistency.

With these objectives in mind, the Bureau selected three areas for the dress rehearsal activities, and officially announced their locations in mid-1986: St. Louis, MO, a large city (405,336 population at that time) containing an inner-city area that would be hard to enumerate; east central Missouri (444,635 population at that time), with three types of enumeration areas (TAR, prelist, and update/leave), 14 primarily rural counties and Boone County, which included the city of Columbia; and an area in eastern Washington State encompassing eight primarily rural counties, and including the city of Pasco and the Colville and Spokane Indian Reservations (258,863 population at that time).

The Bureau selected these sites because, as a whole, they possessed characteristics in terms of population density, mail delivery schemes, rural and ethnic diversity, and terrain that would closely approximate much of the 1990 environment. The close proximity of the Missouri sites

allowed for full implementation of the 1990 outreach and promotion efforts, especially mass-media publicity made up primarily of public-service announcements developed by the Advertising Council.

This was the final test for 1990 census activities. The 1988 dress rehearsal was extensive and comprehensive, encompassing some 497,000 housing units and 1.12 million people. The Bureau was not looking for alternatives—although keeping its options open—but to make final decisions for the 1990 census operation.

In September 1987, plans for the dress rehearsal were called into question when the Office of Management and Budget (OMB), citing the 1980 Paperwork Reduction Act, disapproved the dress rehearsal questionnaire proposal submitted by the Bureau. The Bureau responded with modified questionnaires, but stated that a significant delay in the clearance process would force the postponement of the dress rehearsal until the fall of 1988. By that time, key 1990 census operations were scheduled to begin, and it would be too late to implement any changes identified by the dress rehearsal. Following substantial reaction and justification from the Census Bureau, agreement was reached with the OMB in October 1987 on the questionnaire content. Seven housing questions were moved from the short form to the sample form and three others were eliminated from the sample form. The population questions were not affected. See pp. 52-53 for discussion of this issue.

**The Missouri and Washington test sites.** The Missouri areas were selected as the principal sites to refine the mail-census procedures. The city of St. Louis represented a "typical" city with hard-to-enumerate inner-city areas made up of high proportions of multiunit structures and an old housing stock. The city also contained a large minority population (46 percent Black). The counties of east central Missouri had the right "mix" of mail-addressing systems (house number/street name, rural route, or post office boxes), and also represented a good mix of conditions such as terrain, resort housing, and transportation problems to be handled in field activities. The development of the automated TIGER system was advanced enough to use it in preparing maps and performing automated address assignments for these areas. The close proximity of the urban and rural sites allowed adequate testing of the promotional program planned for the 1990 census.

The Washington site was selected to further assess the feasibility of enumerating by mail small pockets of concentrated populations, referred to as "prelist pockets," scattered throughout sparsely populated rural areas. Most of the Washington site was covered by the conventional door-to-door method of enumeration (referred to as list/enumerate (L/E) enumeration for the 1990 census); however, the area also contained a TAR city—Pasco. This area was chosen also because it contained small towns with mail delivery service scattered throughout sparsely populated, rural areas, together with two American Indian reservations for checking specialized outreach efforts.

<sup>50</sup>The dress rehearsal did not include a type 2A office, which covered urban and rural areas and employed update/leave procedures for the 1990 census. However, the update/leave procedure was used in the east central Missouri dress rehearsal area.

The downtown district office for St. Louis opened in July 1987 and closed in July 1988. The other Missouri district office was in Columbia; it opened in November 1987 and closed in June 1988.<sup>51</sup> The district office for the Washington site, in the town of Moses Lake, officially opened in July 1987<sup>52</sup> and closed in September 1988. The district office managers were full-time, nonheadquarters employees hired locally.

The temporary staffs in the district offices consisted of supervisors, crew leaders, enumerators, and office clerks recruited locally through paid publicity rather than a referral system. All workers were paid hourly rates. The full-time managers received full benefits as federally employed persons, including accrued leave, health benefits, and so forth. Employees working in St. Louis received a slightly higher hourly pay rate (\$6.25 for enumerators) than those in rural Missouri and eastern Washington (\$5.60 for enumerators). Due to the nature of type 1 district offices (located in large urban areas), as well as differences in census methodology and more competitive labor markets, the higher wage was necessary to fully staff the office. Overtime was discouraged and, in most cases, prohibited. However, if overtime (more than 8 hours per day or 40 hours per week) was necessary, advance approval in writing from the district office manager (DOM) was required. Also, field operations supervisors, crew leaders, and enumerators were eligible for supplemental payments in addition to their regular wages based on the successful completion of training and assignments. DOM's were eligible for cash awards upon the recommendation from their regional census center managers.

A new approach to training for operations (prelist, update/leave, and list/enumerate) requiring enumerators to canvass door-to-door, was introduced in the dress rehearsal. The new system, developed from experience in the previous tests, was designed to improve map-use training for census enumerators working in various types of areas and operations. Verbatim training was used in conjunction with a series of maps, with one depicting a fictitious town called Abbotsville. The training took enumerators through a simulated door-to-door enumeration, which included a variety of typical problems encountered during previous tests, and taught them how to handle refusals, commercial establishments, no one home, proxy information from neighbors, and so forth. The materials included multiple map sheets with insets for each enumerator assignment area (address register area, or ARA). The training was broken into two parts, urban and rural, and stressed features of both types of areas. After the end of the training, there was a 47-item test. Following the dress rehearsal, revisions were made to the training package to improve concepts of map interpretation and map symbology, and to make them more consistent with features found in rural areas.

<sup>51</sup>An office was opened in Jefferson City, MO, from November 1986 to April 1987 and used for the prelist operation.

<sup>52</sup>The lease agreement for this office spanned the period from November 1986 to September 1988; the office was used from November 1986 to April 1987 for prelisting.

As mentioned above, the mailout/mailback census method was used as the primary enumeration method in St. Louis, as it was in east central Missouri and portions of Washington State. This required the use of a comprehensive address list. Two techniques were used in compiling this list. For the city of St. Louis and the cities and vicinities of Columbia, MO, and Pasco, WA, computerized address lists were purchased from commercial vendors. Areas in which address lists were purchased and then coded geographically by the Bureau were referred to as tape address register (TAR) areas. The second method, which covered the balance of the east central Missouri site and seven "prelist pockets" in Washington, was to prelist the mailing addresses and related information for all structures in which people lived or could live. All of this was keyed into the computer system to create a master list of mailing addresses, referred to as the address control file (ACF), upon which the enumeration would be based. The temporary processing office in Laguna Niguel, CA, was kept open for processing the initial address list until the 1990 census processing office was opened in Kansas City, MO, on February 17, 1988.

The TAR addresses were checked first in the advance post office check (APOC) on May 18, 1987, in which postal workers added, deleted, and corrected addresses. Then census enumerators checked the list once more in a door-to-door "precanvass" operation in October-November 1987. In November 1987, the Bureau compiled preliminary housing-unit and special-place counts, by block, and sent them to the officials of local governmental units covered by the mailout/mailback procedures to review the accuracy of the counts before the census began. Two additional USPS address checks (casing and time-of-delivery) took place in March 1988, close to the time of questionnaire delivery. The time-of-delivery check was canceled for the 1990 census because there was no appreciable coverage gain relative to the cost.

Prelist addresses also underwent the APOC and two March updates by the Postal Service. The prelist went smoothly, production was high, and there were no major problems. The areas also represented a good rehearsal milieu for the 1990 national prelist because they allowed the testing of concepts in a mixture of mailing address systems, such as house number/street name and rural-route addresses. Also, the dress rehearsal included a preprinted listing of known special places with assignment areas.

In a separate operation called "precanvass," the lists from TAR areas were dependently verified and updated for future use (census workers visited the listed places and verified their existence). The lists helped to minimize misclassification of nonresidential and other addresses (e.g., grocery stores, churches, and schools) as special places. Following the conclusion of the processing of the prelist and prec canvass changes, the accompanying maps were sent to the local regional census center for updating the TIGER file. This was the first major demonstration of adding updates, such as new and renamed features, to the TIGER system.

The Postal Service delivered questionnaires in mail census areas on March 11, 1988, to be returned by Census Day, March 20, 1988.<sup>53</sup> On September 11, 1987, the Bureau had decided to cancel a test of a motivational insert, which was to have been included in the mailing package with the questionnaire (as in the 1986 test) to evaluate its effectiveness on mail response. (The cancellation was due to concern over the appropriateness of the tone of the insert produced by an outside contractor. There had been an extensive effort to revise the insert, but without any agreement on its content, so despite the success of the version used in 1986, it was eliminated.) In preparation for the questionnaire mailing, labels were produced at the district offices from the ACF and affixed to questionnaires for delivery. Two days after the mailout of the questionnaires, postal carriers distributed mail reminder cards. (Following their successful use in the 1986 test, the dress rehearsal was a larger-scale test of these cards, the purpose of which was to remind respondents that time still remained to complete their questionnaires and mail them back.)

Some areas of the Missouri site had enumerator-delivered questionnaires. These were "hard to enumerate" parts of the city of St. Louis and certain rural areas in east central Missouri that had addresses the USPS did not recognize for mail delivery. This procedure, as in 1986, was referred to as urban update/leave (UU/L, limited to public housing developments) and update/leave (U/L, in the rural areas of east central Missouri), respectively. (U/L operations are discussed in more detail below.) The entire east central Missouri site was originally designated for the mailout/mailback enumeration method with all questionnaires being delivered by the Postal Service. This changed following the identification of numerous undeliverable addresses during the advance post office check (APOC). The Bureau decided to change nine entire counties and portions of three other counties to the U/L enumeration method following its successful use in the 1986 tests. The dress rehearsal APOC results had shown that 25 percent of the addresses subsequently designated for U/L could not be checked because the mailing addresses were incomplete. The USPS had marked another 10 percent as undeliverable during the APOC. Questionnaires returned by mail went to the processing office (PO) for the St. Louis site, while those from east central Missouri and Washington were delivered to the district offices (DO's). (Questionnaires returned from type 1 office areas were received in the appropriate processing offices during the 1990 census.) Once received in either the PO or the DO, the questionnaires were checked in against an automated master list of addresses, and then subjected to a series of edits to identify possible content and coverage errors on the forms. Respondents whose questionnaires contained problems were contacted by telephone, if possible. (This operation, called "telephone

followup," took place during March 23-June 8, 1988.) After a minor revision to the procedures in May, in which a section of the telephone followup crews assumed the sole responsibility of telephone number lookup to alleviate backlogs, the operation succeeded (95.4 percent of assigned cases completed by telephone) in accomplishing its goal as an efficient followup method.

The promotional campaign was very extensive and designed to thoroughly evaluate the 1990 plans. It included several programs designed to increase public awareness about the dress rehearsal and encourage support and complete participation by the entire population. The campaign, which proved very successful, was implemented through a series of phases:

The first phase, prior to Census Day, began in October 1987, with portions running throughout the campaign. This phase publicized census benefits, jobs, Census Day, enumeration methodology, confidentiality, and the expected arrival of questionnaires. There were public service announcements (PSA's) for television and radio, themes and logos used in magazine and newspaper advertisements, outdoor billboards, transit cards, posters, flyers, brochures produced by the Advertising Council and the Census Bureau's promotional office. (See ch. 5.) Two minority advertising agencies were hired to develop minority-targeted PSA's (distributed to the media in January 1988) and newspaper supplements (distributed in March 1988 and run in three minority newspapers in St. Louis) detailing the census.

The second phase ran during the census week of March 11-March 20, 1988. This effort focused on the mailback of the census questionnaires. The third phase, or "There's still time," was designed to inform respondents that time still remained to complete and return their questionnaire or to hold it until an enumerator came to pick it up. This was done through the use of the mail-reminder card. The fourth phase occurred during the nonresponse followup activities of April 25-May 27, 1988. Flyers and printed and broadcast news releases sought the public's cooperation with enumerators.

The fifth and final phase was a strategy referred to as "Were You Counted?," which gave people who believed they were missed by the census one more opportunity to be counted. This was done through the publishing of a "Were You Counted?" form (English and Spanish versions) in local newspapers. The form was to be cut out, filled in, and mailed to the census office.

The Census Awareness and Products Program (CAPP) was a primary factor in implementing outreach programs in hard-to-enumerate areas of the population. The program had temporary employees, called census community awareness specialists (CCAS's), supervised and located in the regional census centers, for the five basic outreach strategies. There was one CCAS in the St. Louis site, another for the other Missouri site, and two in Washington. The program employed community networks to identify and access community-based organizations and associations through which to discuss and disseminate census messages and encourage support of the census. A tribal liaison

<sup>53</sup>Census Day was again (as in 1985) 2 weeks before Easter, as it was for the 1990 census, to minimize problems in hiring for nonresponse followup around the Easter weekend.

program was again successful (as elsewhere in 1986 and 1987) for the Spokane and Colville Indian Reservations. In this strategy, two tribal liaisons, one for each reservation, were appointed by reservation officials to assist the CCAS in promotion. This strategy was carried into the 1990 census and included liaisons for Alaska Native villages as well as American Indian reservations.

Additionally, CCAS's worked with school district officials for educational efforts, local officials and influential members of the community for support of the census, and religious leaders to further census awareness through places of worship and religious organizations.

In addition to the outreach activities, and independent of the CAPP, a multilingual motivational mailout message was distributed 1 week before the questionnaire mailout. This flyer had messages in English, Spanish, and two to four Asian languages for areas where English was not the primary spoken language, or where extreme enumeration difficulties were expected. Distribution was by general delivery (USPS) for pre-identified (by the Bureau) ZIP Code areas containing large numbers of the targeted population groups.

The dress rehearsal also included, for the first time, a full-scale systems test under census-like conditions of the family of minicomputers procured for the 1990 data-collection and data-processing offices. The automated system was used for data keying, questionnaire editing, and address file updating, as well as district office payroll processing, assignment control, and cost and progress reporting. The system directly linked headquarters management and the district office system for the purpose of monitoring cost and progress through a daily report referred to as the management information system (MIS). Following a 6-month delay and two bid protests in the procurement process, the contract for the system was not awarded until May 1987, several months after the start of the dress rehearsal. Thus, there was insufficient time for proper development and testing of software, and the staff experienced problems with parts of the automated MIS reports in later stages of the test.

Additionally, problems were discovered with the central processing units in the minicomputers located in the district offices, e.g., slowed response times when several concurrent operations were being done. Also, concerns were expressed that the system might not have sufficient memory to handle the full-scale 1990 census workload. These findings led the Bureau to change its acquisition strategy for the 1990 census. After the delay in the delivery and installation of the minicomputers, the Bureau accelerated development of the software programs to make up lost time. This was done through the successful establishment of a special headquarters systems support group that installed the software and monitored its functions.

Most of the coverage-improvement techniques used in the previous tests were employed again in the dress rehearsal. These included prec canvass, APOC, APOC reconciliation, casing/time-of-delivery check, search/match, unit status review, post-enumeration post office check

(PEPOC) for update/leave areas, pre- and post-census local review, and a "Were You Counted?" campaign. Also, most quality assurance measures tested previously were again implemented, including Spanish language questionnaires, telephone and walk-in assistance centers, and a post-enumeration survey for evaluating coverage.

A new quality-assurance (QA) operation, tested during the dress rehearsal, called QA reinterview, detected data falsification so the appropriate administrative action could be taken to correct the problem. During nonresponse followup, a QA reinterview enumerator (separate from the nonresponse followup enumerator) verified (primarily by telephone) the occupancy status and household roster (occupant names) for a sample of nonresponse enumerators' cases and reported possible discrepancies and data falsification to the office supervisors. The operation worked well and was expanded to include reinterviewing for list/ enumerate areas in 1990.

Search/match was a coverage-improvement operation that evolved from the automation of census processing. During the 1980 census, DO personnel conducted this operation, which attempted to allocate persons temporarily away from home at the time of the census back to their "usual home of residence." Beginning with the 1987 test, search/match took place in the processing office. During the dress rehearsal, the following forms were considered search forms and sent through the procedure: questionnaires from respondents claiming a "usual home elsewhere," military census reports, and "Were You Counted?" forms. The operation allocated persons in a timely manner.

In the "unit status review" operation, enumerators did a field check of units classified as vacant or nonexistent on the address list. This proved successful in correcting enumerator misclassifications and in identifying persons who were missed because they moved during the census period. This procedure was used in 1990, but was renamed the "vacant/delete review."

The dress rehearsal questionnaires were a culmination of the previous tests and approximated the ones to be used in 1990. Sampling for the mail areas was complex and designated as follows:

1. Blocks comprising governmental units with a population equal to or fewer than 1,000 had a 1-in-2 sampling rate.
2. Blocks comprising governmental units with a population between 1,001 and 2,500 had a 1-in-6 sampling rate.
3. Blocks comprising governmental units with a population between 2,501 and 6,250 had a 1-in-10 sampling rate.
4. Census tracts and block numbering areas (BNA's) with 1,000 or fewer housing units had a 1-in-6 sampling rate for blocks not in (1) above.
5. Census tracts and BNA's with between 1,001 and 2,500 housing units had a 1-in-10 sampling rate for blocks not in governmental units of population fewer than 2,500.



6. Census tracts and BNA's with more than 2,500 housing units had a 1-in-20 sampling rate for blocks not in governmental units with a population fewer than 6,250.

In list/enumerate areas, all ARA's in governmental units, including American Indian reservations, with a population of fewer than 1,000, had a 1-in-2 sampling rate; the remainder had a 1-in-6 rate.

"Special place" enumeration procedures in the dress rehearsal covered particular population groups. As in the past, these were for situations where living arrangements differed from the usual types of residences. Prior to the dress rehearsal, Bureau headquarters staff compiled lists of special places from administrative records of government agencies, private agencies, and other sources. In the district offices, staff reviewed the lists and, from local knowledge and information sources (such as the telephone directory), added special places they believed had been missed. Questionable special places were contacted by telephone or personal visit to determine if they should be included in the enumeration. Following the mailing of an advance letter to each special place describing enumeration plans, census enumerators visited each one in a "special place prelist" operation from January 13-22, 1988.

The most important task during this prelist was to determine if the special place existed and to classify the type(s) of living quarters as either housing units or group quarters.<sup>54</sup> Only the latter were enumerated during special place enumeration. (Housing units were included in the regular household enumeration.) Enumeration procedures depended on the type of special place. For example, "self-enumeration" procedures were needed for such population components as ill patients with communicable diseases in a hospital or potentially dangerous prison inmates. The enumeration of the special places included three independent operations: (1) street/shelter night enumeration (S-Night), (2) transient night enumeration (T-Night), and (3) regular group quarters enumeration.

The S-Night operation was a test of counting components of the "homeless," and replaced the 1980 mission night (M-Night) and casual-count operations, and was implemented for the first time in the dress rehearsal. S-Night was conducted during the week prior to Census Day in all areas of the dress rehearsal, but the Bureau's analysis focused on St. Louis city's shelters for the homeless, missions, flophouses, designated street locations, parks, bridges, noncommercial campsites ("tent cities"), all-night movie houses and restaurants, railroad stations, bus depots, and shelters for runaway, neglected, and homeless children. Also, the dress rehearsal S-Night included hotels and motels used entirely for homeless persons regardless of the amount charged per night, as well as designated rooms at motels or hotels regardless of price per night. The individual census reports (ICR's) used here contained the same population questions as the regular

census questionnaire but did not have housing questions. Short-form and sample data were collected from respondents found in shelters. Only short-form population data were collected from persons who were awake during street enumeration (sleeping persons were not awakened, but approximate age, sex, and race were estimated by the enumerator). The test revealed complex problems that led to changes in the training packages and definitions of terms. Finding street-site locations at night was very difficult, and the identification of actual "homeless" populations and the lack of systematic procedures for canvassing large areas (such as city parks and bus stations) created inconsistencies.

T-Night or transient night occurred in the afternoon and early evening on the day after Census Day. Transient units were considered places where people stayed temporarily and had a usual home elsewhere. This operation covered persons staying in transient units in hotels, motels, and tourist homes charging more than \$12 per night, YMCA's, YWCA's, commercial campgrounds, fairs, carnivals, and marinas. Census enumerators dropped off short-form ICR's at each unit, and people staying in them were requested to complete the forms and mail them to the district office. Following an evaluation of the operation during the dress rehearsal, procedural changes were made for 1990 to eliminate the distribution of short-form ICR's to each transient unit of hotels, motels, tourist homes (these types of places were suppressed from the 1990 T-Night universe) based on the results of a cost-benefit analysis designed to eliminate less productive programs. (For more information, see chapter 6.)

Group quarters (GQ) enumeration, which included the self-enumerating procedures for designated special places, began the day following Census Day and continued for 2 weeks. Enumerators visited each group quarters, listed the names of the people staying there in a sampling register designed for this enumeration, and left a short- or long-form (sampling was determined by the register) ICR to be completed. The enumerator returned a day or two later to pick up the completed forms and interview if necessary. Military and Coast Guard station personnel were enumerated with special questionnaires called Military Census Reports (MCR's), using self-enumeration. (See ch. 6.)

After the initial data collection (described below for each area), followup involved the automated printing for the address control file (ACF) of addresses for which questionnaires had not been received. As in the 1986 test, telephoning for callbacks to reduce travel costs and time showed positive benefits, primarily in cost. The enumerator-friendly questionnaire (EFQ) for followup visits was tested again on a larger scale than in the North Dakota test.

A new approach to the block split operation<sup>55</sup> was evaluated. Based on past experience, the Bureau decided to separate the operation into two parts. The change was

<sup>55</sup>This operation was the process of assigning data collected according to its collection geography to the correct tabulation geography (e.g., city and county entities). Enumerators' assignments were based on collection geography, the boundaries of which were determined by physical features (such as roads, rivers, and railroads). The process of assigning each housing unit or group quarters in collection blocks split by

<sup>54</sup>Nine or more unrelated persons sharing living quarters.

made for various reasons, but principally to reduce workloads during the first stage and allow for the incorporation of changes from the followup operations. The first stage, referred to as cycle 1, was conducted in east central Missouri and eastern Washington in September through October 1987, prior to Census Day. The second phase, referred to as cycle 2, was performed in the same areas during the completion of nonresponse followup and the beginning of field followup, between May and June 1988. Separate cycles ensured more accurate boundaries and data allocation within those boundaries for particular census operations. Upon completion, the appropriate forms were sent to the processing office for keying into the automated system.

**Data collection procedures unique to St. Louis.** Mail was the primary data-collection method tested in St. Louis; however, two variants were tested: The first had the USPS deliver questionnaires; this was referred to as "mailout/mailback." The other method, in which census enumerators delivered questionnaires, was referred to as "urban update/leave"(UU/L). This latter method, being tested for the first time, was designed to ensure that the proper questionnaire got to the designated housing unit in hard-to-enumerate areas within the city (rather than being left in a pile or indiscriminately distributed), so the Bureau would know which ones were returned and thus follow up at the correct units. Targeted areas for this method were low-income, high-density, multiunit public housing developments where mail delivery was thought to be ineffective.

Also, two types of short-form mailing packages were tested—a "traditional" package, as used during the 1980 census, in which the respondent had to place the completed questionnaire in a separate return envelope and mailed it, and a "self-mailer" package, in which a short-form questionnaire and associated instructions would be returned in the same envelope in which the package was mailed. (A self-mailer prototype had been tested during the 1987 test in North Dakota, but it was never formally evaluated.) With advances in printing technology, the Bureau believed several desirable advantages existed with the self-mailer questionnaire packages that did not exist with "traditional" packages. These included one-step printing and assembly, and addressing the outgoing and return envelopes in one step. Results showed that the self-mailer package did not substantially affect the mail response rate nor did it reduce the number of postmaster returns. (The motivational insert was an extension of the envelope's inside flap; the respondent was asked to tear the insert off.) Furthermore, the dress rehearsal revealed that during the casing and time-of-delivery checks, repeated handling of the self-mailer questionnaire packages tended to tear the perforated edges of the outgoing/return envelopes. Additionally, a large number of calls were received from respondents saying they did not receive a questionnaire return

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political or statistical boundaries to its proper geographic unit was referred to as block splitting.

envelope. Even though using self-mailer packages still appeared feasible, they were not used in 1990: The 1990 questionnaire printing contract had to specify (for impartial bid proposals) either a self-mailer or a conventional mailer. The selected contractor produced a conventional mailer.

The overall mail-return rate for St. Louis was 61.9 percent. This rate was a combination of a 62-percent mail return rate for mailout/mailback areas and a 54.1-percent return rate for UU/L areas. The overall mail return rate was about 20 percentage points higher than for each of the other hard-to-enumerate inner-city test areas of Jersey City (42.3 percent) and the north office of central Los Angeles County (45.3 percent).

Approximately 4,500 cases were selected for the UU/L procedure. Enumerators were recruited from the public housing developments, for reasons of familiarity and local knowledge, to deliver household questionnaires to specific units and update the address list. Respondents were to fill out the questionnaires and mail them back. The UU/L addresses did not include the corrections to the address lists from the advance post office check (APOC), since the Bureau did not plan to have the USPS check UU/L materials in 1990.

Mail-return questionnaires from St. Louis went directly to the processing office in Kansas City, MO. However, enumerator-completed questionnaires from nonresponse and field followup were returned to the St. Louis district office for review before being sent to the processing office.

**Data collection procedures unique to east central Missouri.** Two enumeration methods were used for this test area: the mailout/mailback, using the USPS, and a procedure in which enumerators, working in prelist areas, delivered questionnaires in rural areas. This was referred to as "update/leave" (U/L), and had enumerators canvass an area, update the prelist address list and maps, and deliver questionnaires to housing units. The mailing of the questionnaires occurred on March 11. The "update/leave" operation took place between February 20 and March 11.

Completed questionnaires were received in the local district office, checked in on the automated control system following appropriate edits of the questionnaires by office clerks, and shipped on a flow basis to the processing office. The mail-return rate for mailout/mailback areas was 67.4 percent and the U/L areas was 77.4 percent. U/L areas had a significantly higher mail return rate than mailout/mailback areas; however, the U/L method cost more per housing unit. Nevertheless, it improved enumeration and was used in large areas of the Midwest and the Southeast in 1990.

Following the completion of the U/L and nonresponse followup, a coverage-improvement operation involving the USPS identified missing and duplicate addresses. This second check was called the post-enumeration post office check (PEPOC; see p. 51 for description) and used procedures similar to the APOC. However, in order to more closely simulate the 1990 procedures, the PEPOC address list did not reflect any updates made after the prelist operation. (Several counties had been converted to update/leave

after the APOC, as noted above; U/L areas were not subjected to an APOC in 1990.) To reduce costs and maximize the coverage gain, only a sample of areas was selected for this field reconciliation. Where this was done (about 24.4 percent of the total number of U/L addresses), evaluation showed a coverage gain of 0.8 percent. This rate was slightly higher than the PEPOC gain in the 1980 census, but costs associated with adding a unit were much higher than for other coverage-improvement operations. For example, the direct unit cost for this reconciliation was \$3.90 per case, but the 1987 test of PEPOC reconciliation averaged \$5.43 per case. Compared with a \$2.30-per-case cost for the APOC for the Missouri site, PEPOC costs were high. Additionally, the dress rehearsal PEPOC results showed that the cost per PEPOC add was \$128, compared with a \$19-per-PEPOC add reported in the 1980 census. Following lengthy discussions among Bureau staff on projected costs of the operation for 1990 and how to curtail them, a decision was made to drop the PEPOC for 1990.

**Data collection procedures unique to eastern Washington.** This site was selected to test whether areas with small prelisted (see pp. 41-42) "pockets" of clustered, urban population located in large areas of rural, sparsely populated areas could be enumerated successfully by mailout/mailback, while the sparsely populated, rural areas (estimated at fewer than 15 persons per square mile) were enumerated with conventional, door-to-door visits (list/enumerate; see pp. 45-46 for description). Six counties, including the Colville and Spokane Indian Reservations, were enumerated this way.

Enumerators used callback records, printed in the back of their listing pages, to record personal visits and telephone callbacks to follow up households where no one was home at the time of the visit. Telephone followup was used if the enumerator was able to obtain a telephone number for the household and if the respondent agreed to be interviewed that way.

In 1990, this kind of district office would be referred to as "type 3." The idea of using a mail census in prelist pockets cut the cost associated with door-to-door enumeration and was used during the 1990 census.

Questionnaires were returned to the district office, edited, and subsequently sent to the processing office.

The quality-assurance device used for the list/enumerate area, designed to evaluate the quality of enumerators' coverage of housing units, consisted of an advance listing by crew leaders of a sample of addresses in each address register area. The addresses were then checked against the enumerators' listings; if two or more addresses were missed, the work was deemed unacceptable and the area had to be recanvassed and missed housing units visited as above. This advance listing procedure was used in 1990, although only in half (odd numbered) of the ARA's due to cost.

Additionally, a PEPOC operation, similar to the one in the update/leave areas of Missouri, was in the early dress rehearsal plan as a form of coverage improvement. Later,

it was decided to limit the PEPOC to the U/L areas and not to check the list/enumerate (L/E) areas, since most of the listings compiled during L/E were physical descriptions and would not be recognized by the USPS.

A post-enumeration survey (PES), following the dress rehearsal data-collection activities, served two purposes; it was both an evaluation of the dress rehearsal and a major element planned for 1990. The 1990 PES would have direct implications on the adjustment decision. As part of the coverage-evaluation programs for the 1980 census, the PES then involved interviewing a sample of households after the census and checking the names and addresses collected against census records to ascertain whether the individuals and housing units had been counted. To maintain independence for coverage measurement in the field, the PES staff differed from the census staff. (Other coverage evaluation techniques (such as demographic analysis) could produce estimates of coverage for the national level and for certain characteristics (age, sex, race), but a relatively large-scale sample such as the PES was needed to produce coverage estimates for subnational areas and for socioeconomic characteristics.) The PES had five main operations: listing, interviewing, matching, followup, and estimation. In February 1988, interviewers listed housing units in pre-identified PES sample blocks to create a file for field-interviewing and processing-office control. An advance listing of addresses took place in all types of enumeration areas for the purpose of quality assurance.

The PES sample consisted of approximately 10,000 housing units (HU's), 6,000 in St. Louis, 3,000 in eastern Missouri, and 1,000 in rural Washington State. To reduce the survey workload, TAR and prelist area blocks with 70 or more housing units were subsampled, with approximately 45 HU's selected for the PES. Similar subsampling took place in list/enumerate areas after 20 sample addresses had been listed.

Following field interviewing (during 5 weeks in July and August 1988) and questionnaire editing, questionnaire matching took place. This required matching the interview questionnaires with the actual census forms to determine if the persons listed had been enumerated in the census. Followup interviews of nonmatched cases determined whether a person was correctly enumerated in the census but missed in the PES, or erroneously enumerated in the census. After review and some rematching of the followup cases, the Bureau estimated the dress-rehearsal coverage: For all persons, the estimated undercount rate was 6.2 percent for St. Louis city, 5.4 percent in east central Missouri, and 6.8 percent in eastern Washington State. In general, the Bureau staff was satisfied with the way the PES procedures had worked.<sup>56</sup>

The dress rehearsal gave data users the first opportunity to work with data products produced by TIGER files. The

<sup>56</sup>Cf. Danny R. Childers and Howard Hogan, "The 1988 Dress Rehearsal Post Enumeration Survey," STSD 1990 Dress Rehearsal Memorandum Series V-22, Dec. 27, 1990; published with slightly different title in American Statistical Association, 1990 *Proceedings of the Section on Survey Research Methods*, pp. 547-552.

Voting District Program (one phase of the Public Law 94-171 Redistricting Data Program) was evaluated in Boone County, MO as part of plans for releasing census data on TIGER/Line® files. The final data products for this area were formatted and released to the public.

The overall mail return and response rates for the dress rehearsal were as follows:

Test site	Response rate (at nonresponse followup)	Return rate
St. Louis city . . . . .	49.3	61.9
East central Missouri . . . . .	57	72.9
Mailout/mail back . . . . .	55.8	67.4
Update/leave . . . . .	57.9	77.4
Eastern Washington . . . . .	55.6	63.1

The total cost of the 1988 dress rehearsal was \$29,293,000.

### 1989 Special Survey

In the spring of 1988, Asian and Pacific Islander (API) community leaders expressed strong concerns about obtaining high quality data for detailed API groups. They proposed to the Bureau the inclusion in the 1990 census race question of a list of specific API categories (as in 1980), and not just the general category "Asian or Pacific Islander"; also, write-in entries on a 100-percent basis, making possible 100-percent counts of these specific groups down to the block level.

Following the directives of Congress and the response of the API community, the Bureau recommended that the 1990 census include the race question with the new additions. This new version contained 16 response categories, one more than in 1980. Two boxes were provided for write-in responses: one box for American Indian tribe entries and the second box to be shared for "Other API" subgroup entries or "Other race" entries.

A survey in late 1989 (Census Day was October 10, 1989) evaluated a revised format of responses proposed for the yet-untested race question. Also, it evaluated the design format's clarity and determined whether the modified race question caused respondents not to report completely.

During the survey, a targeted sample of approximately 40,000 housing units was selected, rather than a national sample, to increase the potential frequency of write-in responses to the test question. The selected sites consisted of urban and rural communities with high concentrations of the targeted subpopulations (primarily American Indian and Asian and Pacific Islander) based on the 1980 census results—five metropolitan areas (Philadelphia, Chicago, Detroit, New York, and San Diego) and two rural sites (in West Virginia and Mississippi).

The self-administered, mailout/mailback test used the proposed 1990 census short-form questionnaire with a revised cover. The questionnaires were to be returned by October 10, 1989, to the Bureau's Jeffersonville, IN office, where they were processed on a flow basis using the

planned FOSDIC<sup>57</sup> procedure. (This test did not assess new methods of data processing.) To improve the response rate, there was a complete second mailout 2 weeks after the first one. Additionally, each household receiving a questionnaire also received a letter from the Bureau's director explaining the survey and stating that participation was mandatory by law. There was no formal report produced in association with this special survey.

The survey evaluated the accuracy and completeness of the responses to the race question (i.e., how well respondents were able to understand and correctly mark the FOSDIC circles with write-in spaces). Of the total number of race write-in responses (2,157), the overall results showed strong support for the existing race question and the race coding procedures. However, problems found included—

- Substantial misreporting of write-in entries in the American Indian space.
- A sizeable proportion (about one-third of the coding universe) of the persons with a write-in response to the race item did not fill a FOSDIC race circle.
- A relatively small, but larger than expected, proportion of persons in the coding universe (6 percent) filled two or more circles.

The results were good indicators of reporting problems that could happen during the 1990 census, and allowed the Bureau to refine its automated race-coding procedures and edits.

### OFFICE OF MANAGEMENT AND BUDGET (OMB) REVIEW OF CENSUS QUESTIONNAIRE

On June 17, 1987, the Census Bureau submitted to the OMB, for its approval, the proposed 1990 census questionnaires (to be used in the 1988 dress rehearsal) and the proposed sample design for 17 million households in the 1990 census. As part of its responsibility in the Federal Government to monitor respondent burden, the OMB reviewed the document using the guidelines set forth in the Paperwork Reduction Act of 1980, and announced that it was considering substantial cutbacks in the questionnaire content and sample size.

In a September 16, 1987 letter, the OMB disapproved the Bureau's submission, saying that it did not meet the Act's criteria of practical utility and minimization of burden, and ordered the following revisions:

- Delete 3 housing questions (type of heating equipment, fuel used for heating water, and utility costs) from the long form and move 7 of the 10 short-form housing questions to the long form.
- Omit the question calling for a telephone number, and simply have the respondent enter a contact number on the back cover of either questionnaire.
- Redesign the sample, so that the national sample for the long forms would not exceed 10 million households.

<sup>57</sup>Film optical sensing device for input to computers.

- Limit the maximum sampling rate to 50 percent, but vary the fraction; e.g., raise it from the current 1-in-6 in rural areas and lower it—perhaps to 1-in-20—in densely populated urban areas.

The OMB stated that its suggested changes would improve efficiency, increase mail response rates, and lead to a better count.

The Bureau resubmitted questionnaires consistent with the OMB's guidance, but included estimates of data precision associated with the sample design changes. The Census Bureau had received substantial support from the data user community in disagreeing with the proposed OMB guidelines. The OMB, however, continued to hold firm, insisting on the major changes. Action on the issue then moved to the Congress. In several hearings, OMB representatives were asked to explain their position. The consensus in the user community was to proceed with the original plan submitted by the Bureau to the OMB, with minor exceptions. The Bureau received final approval for the short and long-form dress rehearsal questionnaires on October 15 and October 28, 1987, respectively.

Following months of discussion, research, and public comment, the OMB and the Census Bureau announced their agreement on the 1990 census content and sample design on March 29, 1988. The goals of the agreement were to minimize the paperwork burden on the Nation's households, to maintain or improve data quality, and to meet the data needs of the 1990's. The 1990 census retained the full sample size requested by the Census Bureau and most of the questions. The sample design consisted of an overall sample of 1-in-6, except in census tracts with about 2,000 or more housing units, which were sampled at 1-in-8, rather than 1-in-6 as in the 1980 census, and a rate of 1-in-2 in governmental units of less than 2,500 population. Two sample questions (on types of heating equipment and fuel used for heating water) were dropped, and three questions (plumbing facilities, whether the housing unit was a condominium, and whether the housing unit had a telephone) were moved from the short form to the long form.

Another decision, reached with congressional encouragement, required the Bureau to code Asian and Pacific Islander subgroups and American Indian tribes on a 100-percent basis. Also, the version of the Spanish/Hispanic-origin question allowed tabulating data on a 100-percent basis for four Spanish/Hispanic subgroups (Mexican-American, Puerto Rican, Cuban, and other Spanish).

## THE MINICOMPUTER CONTRACT FOR THE 1990 CENSUS

In view of the high workloads associated with the 1980 census, the Bureau decided to increase automation activities for the 1990 census. The agency's goal of releasing census results in a timely fashion also contributed to the development and implementation of an extensive automation plan.

In January 1986, the agency decided to procure an estimated 555 minicomputers through an indefinite-quantity type contract<sup>58</sup> for a minimum amount of \$6.9 million and a maximum amount of \$80 million over 6 years (1987-1993). The Bureau's plans for integrating the minicomputers into the 1990 census included automating the questionnaire check-in process, keying some questionnaire and address information, and improving map preparation. The Bureau also planned to use this equipment to automate aspects of the current surveys program and the agriculture and economic censuses.

The Bureau issued the request for proposal (RFP) in September 1986 and awarded the minicomputer contract in May 1987, much later than the original target date of November 1986. This 6-month delay in procurement reflected the time needed to overcome Department of Commerce concerns about the specifications. The Commerce Department believed a key requirement—that the system be fully compatible—restricted competition and did not satisfy the justification required by Federal regulations for procuring ADP equipment. Despite these concerns, the Commerce Department eventually approved the procurement request.

Three offerors filed two bid protests with the GSA Board of Contract Appeals (GSBCA), contesting the Bureau's assertion that their proposals did not adequately respond to the specified technical provisions for relational data base capabilities. The Commerce Department settled the first bid protest with a \$1.1-million payment. It was decided to do this, regardless of the protest's merit, because the Bureau could not afford the delay the administrative process would have required. A second bid protest, filed on May 22, 1987, involved two offerors. The first contended that it should have been awarded the contract since it had proposed a lower bid price than the winning offer. The second offeror maintained that the Bureau had notified it on February 13, 1987, that it had been eliminated because of a noncompetitive bid offer. After a May 29, 1987 hearing, the GSBCA temporarily suspended the Bureau's procurement authority, thus leading to a June 11, 1987 withdrawal of both protests. Neither offeror gave reason for the withdrawal. The bid protests placed heavy strains on the Bureau's procurement office. This led to further procurement delays of equipment for the decennial census, such as monochromatic electrostatic plotters used to produce the maps.

The major effects of the delayed procurement were the postponed development and testing of software for the 1990 census and the slow start of the address-list development for suburban and rural areas. Also, as of February 1988, final automation plans had not been decided upon, so the decision was made that the address control file (ACF),<sup>59</sup> one of the principal functions planned for the

<sup>58</sup>A contract in which a range of equipment, supplies, and services were provided for a stated amount of money over a fixed period of time.

<sup>59</sup>The address control file was the residential address file used to generate the labels for the mailout and enumerator delivery of the questionnaires before Census Day. During the questionnaire processing operation, the ACF was used in identifying nonresponse problems.

minicomputers, would not be maintained on that equipment, as originally decided at the Decennial Census Decision Conference. Instead, an abbreviated version of the ACF, the collection control file (CCF),<sup>60</sup> would take its place on the minicomputers and the file would be maintained on the Bureau's mainframe computers at Suitland headquarters. Also during this period, the original plan of having 49 processing offices was simplified to 11, a figure later reduced to 7.

These delays affected the Bureau's planned tests of the minicomputer software in the 1988 dress rehearsal, which began in 1987 and continued through 1988. Since the contract was not awarded until May 1987, the system could not be implemented for the initial dress rehearsal operations. This kept the Bureau from thoroughly testing and developing the necessary software under census-like conditions. However, it was able to use the system in the later operations of the 1988 dress rehearsal. A few technical problems surfaced relating to the functioning of the system

(such as those relating to automated operations progress reporting, slowing of central processing units when running concurrent operations, etc.). This led the Bureau to change its equipment plans to include later-model minicomputers with more memory and speed. Following the discovery of these problems, the staff planned a reporting-system contingency backup in case of software breakdowns or "crashes" during the 1990 census. The plan called for the incorporation of a manual processing system for support until the automated system was repaired. In deciding to seek a higher-capacity model of computer, the Bureau elected to lease some of the minicomputers as opposed to buying them. It purchased 105 minicomputers and leased, with an option to buy, 362 more. Other factors considered in this strategy change were that the units would not be needed after the decennial census and the future market value of this type of used equipment was not known. While the Bureau spent approximately \$165,000 for the newer, more powerful minicomputers, it obtained enhanced computer capability for an increase of only 0.7 percent over the originally planned expenditure of \$22.6 million (see table 2).

<sup>60</sup>A series of programs and files used to track the progress of major census operations by a series of identifying codes.

**Table 2. Cost Comparison of Mimicomputer Acquisition Strategies**

Equipment	Acquisition strategy	
	Lease/purchase combination	Purchase only
Purchase price (per microcomputer system) <sup>a</sup> .....	\$ 74,365	\$ 50,278
Number of systems purchased .....	105	450
Subtotal (purchased equipment) .....	\$ 7,808,325	\$ 22,625,100
Lease price (per microcomputer system) .....	\$ 44,365	-
Number of systems leased .....	362	-
Subtotal (leased equipment) .....	\$ 16,060,130	-
Total cost of leased and purchased equipment .....	\$ 23,868,455	\$ 22,625,100
<b>Electric power and maintenance cost savings</b>		
Power savings .....	(\$ 308,055)	-
Maintenance savings .....	(\$ 770,400)	-
Total savings .....	(\$ 1,078,455)	-
Cost of alternative acquisition strategies .....	\$22,790,000	\$ 22,625,100

<sup>a</sup>Price included the minicomputer and peripheral equipment such as printers, disk drives, cables, etc.



## APPENDIX 2A. Dates and Locations of Planning Meetings

### Local Public Meetings

<b>Date 1984</b>	<b>Place (attendance)</b>	<b>Date 1985</b>	<b>Place (attendance)</b>
Apr. 10	Dallas, TX (145)	Jan. 10	San Francisco, CA (133)
Apr. 25	Columbia, SC (69)	Jan 11	Carson City, NV (51)
Jun. 05	Boston, MA (141)	Feb. 6	Santa Fe, NM (62)
Jun. 12	Denver, CO (168)	Feb. 26	Tallahassee, FL (33)
Jun. 14	Seattle, WA (115)	Feb. 27	Miami, FL (150)
Jun. 19	Chicago, IL (169)	Mar. 5	San Juan, PR (150)
Jul. 19	Philadelphia, PA (108)	Mar. 7	Charlotte Amalie, VI (15)
Jul. 31	Raleigh, NC (123)	Mar. 12	Milwaukee, WI (81)
Aug. 2	Atlanta, GA (91)	Mar. 15	Washington, DC (50)
Aug. 7	St. Louis, MO (121)	Mar. 26	Phoenix, AZ (141)
Aug. 21	Detroit, MI (124)	Mar. 27	Houston, TX (150)
Aug. 23	Lansing, MI (112)	Apr. 2	Montgomery, AL (65)
Sept.12	New York, NY (262)	Apr. 3	Jackson, MS (59)
Sept.18	Charleston, WV (24)	Apr. 17	Providence, RI (52)
Sept.20	Columbus, OH (70)	Apr. 18	Hartford/New Britain, CT (110)
Sept.25	Nashville, TN (59)	Apr. 24	Richmond, VA (50)
Oct. 11	Trenton, NJ (92)	Apr. 2	Topeka, KS (41)
Oct. 16	Montpelier, VT (26)	May 8	Jefferson City, MO (38)
Oct. 18	Concord, NH (20)	May 14	Helena, MT (53)
Oct. 23	Portland, OR (62)	May 15	Boise, ID (32)
Oct. 25	Baltimore, MD (81)	May 16	Harrisburg, PA (86)
Oct. 30	Indianapolis, IN (57)	May 22	Pittsburgh, PA (77)
Nov. 1	Louisville, KY (84)	Jun. 4	Augusta, ME (54)
Nov. 8	Albany, NY (124)	Jun. 11	Anchorage, AK (30)
Nov. 15	Oklahoma City, OK (81)	Jun. 12	Juneau, AK (32)
Nov. 27	Los Angeles, CA (134)	Jun. 18	St. Paul, MN (126)
Nov. 29	Sacramento, CA (81)	Jun. 19	Des Moines, IA (53)
Dec. 4	Little Rock, AR (53)	Jul. 9	Salt Lake City, UT (73)
Dec 6	Baton Rouge, LA (80)	Jul. 10	Cheyenne, WY (23)
		Aug. 13	Honolulu, HI (35)
		Aug. 15	Dover, DE (46)
		Sept. 11	Sioux Falls, SD (23)
		Sept. 17	Bismarck, ND (26)
		Sept. 18	Lincoln, NE (47)
		Oct. 8	Springfield, IL (58)
		Oct. 10	Austin, TX (133)

## APPENDIX 2B.

# Memorandum Series Pertaining to 1990 Census Planning

The documents listed below were prepared for internal office use with the aim of circulating information among Bureau staff members as promptly as possible. The ones dealing with evaluation (unless presented as papers) did not undergo the review and clearance normally associated with published Census reports; the opinions, conclusions, and recommendations reflected the thoughts of certain staff members at particular points in time and were not

necessarily statements of the agency's position. Distribution outside the Bureau was essentially limited to technicians requesting specific information needed for their own research.

The titles of some of the memorandums have been edited to give a better indication of the subject, or shortened to avoid redundancy.

### 1985 TEST CENSUSES

#### Decision Memorandums (1985)

1. March 1984 "Payroll System"
2. March 1984 "Recommended Sample Sizes for the 1985 Pretest"
3. April 1984 "1985 Decision Series (Content, Residence Rules and Counting Rules)"
4. April 1984 "Processing Office Site and Address List Source"
5. June 1984 "Role of the State Data Centers in the 1985 Pretest"
6. June 1984 "No Enumerator Update to Census Block Numbering Area (CBNA) Maps During the 1985 Pretest"
7. June 1984 "Residential Telephone Customer File"
8. June 1984 "1985 Collection Office Structure"
9. July 1984 "Telephone Assistance Number and Questionnaire Assistance Center"
10. June 1984 "Unit-by-Unit Precanvass Schedule"
11. August 1984 "Decision on Keying Names in Computer Readable Form in 1985"
12. August 1984 "Labeling of Questionnaires"
13. November 1984 "1985 Pretest Questionnaires"
14. December 1984 "Process for Review and Finalization of 1985 Pretest Specifications, Procedures, and Public Use Forms"
15. January 1985 "1985 Pretest, Tampa Annexation"
16. July 1985 "Cancellation of Second-Stage Nonresponse Followup Activities for 1985 Test Census of Jersey City, New Jersey"
17. July 1985 "Sample and Related Data Conversion Requirements from the 1985 Test Censuses"
18. February 1986 "Release of 1985 Test Census Data"

#### Documentation Memorandums (1985)

1. July 1985 "Erroneous Adds to the Tampa Address Control File (ACF)"
2. July 1985 "Mispositioned Bar Code on DB-8 Envelope"
3. July 1985 "Operational Problems in Telephone Questionnaire Assistance"
4. August 1985 "Analysis of Duplicate Identification Numbers (ID) Problems in Tampa and Jersey City"
5. August 1985 "Problems with Shipping and Receiving Small Quantities of Questionnaires for the 1985 Test Census"
6. August 1985 "Test Census Problems—Installation of Digital Data Telephone Service in Tampa, Florida, and Jersey City, New Jersey"
7. September 1985 "Early Receipt of 1985 Test Census Questionnaires"
8. September 1985 "Problems with Receipt of Materials from National Computer Systems (NCS)"
9. October 1985 "1985 Test Census Experience and Recommendation Documentation—Nonresponse Followup Training"

10. October 1985 "1985 Test Census Experience and Recommendation Documentation—Coordination of Non-Census Bureau Visitors"
11. October 1985 "1985 Test Census Experience and Recommendation Documentation—Management Information System (MIS) Data Needs"
12. October 1985 "1985 Test Census Experience and Recommendation Documentation—Special Data Requests"
13. July 1986 "1985 Test Census Experience and Recommendation Documentation—Field Collection Control"

#### **Information Memorandums (1985)**

1. April 1984 "1985 Pretest Design"
2. May 1984 "1985 Pretest Advance Post Office Check (APOC) Operational Design Functions"
3. July 1984 "Control of the Jersey City Split Panel"
4. August 1984 "Jersey City Collection Office Schedule"
5. August 1984 "Distribution of Printed Field Materials—1985 Pretest"
6. August 1984 "Questionnaire Issues for 1985 Pretest"
7. September 1984 "Pretest Terminology"
8. November 1984 "Local Review Program for the 1985 Census of Tampa, Florida, and Jersey City, New Jersey"
9. January 1985 "1985 Pretest Special Place Forms"
10. January 1985 "Activities Calendars for Jersey City and Tampa Collection Offices"
11. January 1985 "1985 Pretest Questionnaires"
12. January 1985 "1985 Pretest 'Were You Counted?' Forms"
13. February 1985 "1985 Pretest Questionnaire Instruction Guides"
14. March 1985 "1985 Pretest Public Use Forms and Questionnaire Packages"
15. March 1985 "1985 Test Census, Processing Office Observation Visits"
16. April 1985 "1985 Test Census, Status of Outreach and Promotion for the 1985 Test Census"
17. April 1985 "1985 Test Census Spanish Questionnaires and Guides"
18. April 1985 "Administrative Lists for the Hard-to-Count Study"
19. June 1985 "Use of Terminology Related to Mail Response and Mail Return Rates"

#### **Preliminary Research and Evaluation Memorandums (1985)**

1. December 1984 "Establishment of Preliminary Research and Evaluation Memoranda Series"
2. March 1985 "1985 Pretest—Results of the Quality Control of the Ink Jet Labeling Operation for the Advance Post Office Check"
3. March 1985 "1985 Pretest—Verification Results of the Assembly of Precanvass Kits"
4. March 1985 "1985 Pretest—Quality Control of Keying Advance Post Office Check Data"
5. March 1985 "1985 Pretest—Verification Results of the Printing of Precanvass Address Registers"
6. March 1985 "Results of the Advance Post Office Check (APOC) II in the 1985 Pretest"
7. March 1985 "Results of the Systems Test for Precanvass Updating of the Address Control File"
8. May 1985 "1985 Tampa, Florida Test Census—Review of Age Reporting"
9. May 1985 "Results of the Systems Test for Collection Office Updating of the Address Control File"
10. May 1985 "Results of the Precensus Local Review and the Special Place Prelist Updates to the Address Control File"
11. May 1985 "Results of Blue Card and Yellow Card Updates to the Address Control File"
12. May 1985 "Preliminary Unit-by-Unit Precanvass Findings"
13. May 1985 "Documentation of the Pre-Mailout Results of the Evaluation of the 1985 Jersey City Split Panel Design and Sample Selection"
14. June 1985 "Results of the Quality Control of the Advance Post Office Check in the 1985 Pretest"
15. June 1985 "Quality Control Results of the Printing of Keyed Questionnaires"
16. June 1985 "1985 Test Census—Verification Results of the Optical Mark Reader Data Capture"
17. June 1985 "1985 Test Census Final—Verification Results of the Processing Office Mail Returns Questionnaire Check-In"
18. June 1985 "Documentation of the Split Panel Design and Selection for the 1985 Jersey City Test Census"

19. June 1985 "Focus Groups"
20. June 1985 "Final Verification Results of Assembled Kits"
21. July 1985 "1985 Test Census—Verification Results of the Keying of 100-Percent Data"
22. July 1985 "1985 Test Census—Mail Response Results for Jersey City and Tampa"
23. July 1985 "Results of Nonresponse Followup Supplement in the 1985 Test Censuses of Jersey City and Tampa"
24. July 1985 "1985 Test Census—Request for Spanish-Language Questionnaires: Results"
25. August 1985 "1985 Test Census—Quality Control Results of Edit Review"
26. September 1984 "1985 Test Census—Results of the Precanvass Address Register Keying and Address Control File Updating operations"
27. September 1984 "Reference File Enhancement Study—1985 Test Census, Tampa, Florida"
28. September 1984 "Results and Analysis of the Urban Address List Compilation Test (ALCT)"
29. September 1984 "1985 Test Census—Coverage Improvement Results for the H4 Edit Followup and Recommendations for Future Use"
30. October 1985 "The Jersey City Split Panel—Preliminary Report"
31. October 1985 "Results of the Labeling and Assembly of Keyed Questionnaires Mailing Packages"
32. November 1985 "Edit Review and Telephone Followup 1985 Test Census"
33. November 1985 "Impact of the Edit of Question Q1 on Within-Household Coverage for the 1985 Test Census"
34. November 1985 "1985 Test Census—Verification Results of the Keying of 100-Percent Data"
35. November 1985 "Quality Control Results of Operations for the Optical Mark Recognition Questionnaire"
36. November 1985 "Some Results of the Exception List Feasibility Study—1985 Test Census"
37. November 1985 "Cost Data for the H4 Edit Followup in the 1985 Test Census"
38. January 1986 "Results and Analysis of the Rural Address List Compilation Test (ALCT) (Cover: Use of Postal Service in Rural Mail Areas for the 1990 Census)"
39. January 1986 "1985 Test Census Job Analysis Report"
40. January 1986 "1985 Test Census Surname Keying: Analytical Results"
41. January 1986 "Demographic Data for Jersey City Nonresponse Followup Enumerators"
42. January 1986 "Preliminary Results of Tampa, Florida Census/PES Match"
43. January 1986 "Verification Results of the Address Control File Update Keying Operation"
44. January 1986 "Evaluation of 1985 Test Census Data Quality"
45. April 1986 "Revision of Evaluation of the Storefront Supervisory Structure Feasibility Study"
46. February 1986 "1985 Test Census Evaluation of the Coding of Group Quarters by Type and Inmate Status"
47. March 1986 "Report on Characteristics of Nonresponse Enumerators"
48. March 1986 "Dependent Evaluation of the Computer Matches for the 1985 Post Enumeration Survey"
49. April 1986 "Preliminary Results of Quality Control of the Precanvass Operation for the 1985 Test Census"
50. April 1986 "Documentation of the 1985 Test Census—Post-Census Results of the Evaluation of the 1985 Jersey City Split Panel Design and Sample Selection"
51. April 1986 "Results of the 1985 Jersey City Test Census Data Quality Study"
52. April 1986 "Evaluation of the Occurrence of Falsification During the 1985 Test Census Nonresponse Followup Operation"
53. May 1986 "1985 Test Census—Optical Mark Reader Data Capture"
54. May 1986 "Characteristics of Postmaster Returns in the 1985 Test Census"
55. May 1986 "Impact of the Nonrelative Edit on the 1985 Test Census"
56. June 1986 "Evaluation of the Feasibility of Purchasing a Residential Telephone Customer File (RTCF) to Obtain Telephone Numbers for Use in Nonresponse Followup—1985 Test Census"
57. June 1986 "Results of the Split Panel Cost and Timing Evaluation of the 1985 Test Census in Jersey City, New Jersey"
58. June 1986 "Results of the 1985 Jersey City and Tampa Test Censuses Sample Design Study"
59. July 1986 "Tampa, Florida Match Study of Telephone Company Addresses and Census Address Control File"
60. September 1986 "Impact of the Edit and Followup of Questions H1, H2, H3 and of Questionnaires With Seven Filled Person Columns on the 1985 Test Census"

61. September 1986 "Comparison of the Number of Corrections From the Unit-by-Unit Precanvass Operation and Results of the Analysis of the Checkmark File Data in the 1985 Test Census"
62. November 1986 "Overview and Summary of the Forward Trace Study"
63. November 1986 "1985 Post Enumeration Survey"
64. January 1987 "Effects of Mail Reminder Cards in the 1985 Test Census of Tampa, Florida"
65. [Not Issued]
66. January 1987 "Results of the Study of Duplication in Conversions from the Vacant/Delete Check in the 1985 Test Census"
67. February 1987 "1985 Test Census Evaluation—Characteristics of Nonrespondent Households"
68. February 1988 "Results of the Unit Status Review Evaluation for the 1985 Test Census"
70. July 1988 "Mail Return Rates for 1985 Test Census of Jersey City, New Jersey, and Tampa, Florida"

## 1986 TEST CENSUSES

### Decision Memorandums (1986)

1. March 1985 "Process for Review and Distribution of 1986 Test Census Materials"
2. June 1985 "Sampling Rate for the 1986 Test Censuses"

### Documentation Memorandums (1986)

1. May 1986 "Early Delivery of Update/Leave Reminder Cards—East Central Mississippi"
2. June 1986 "1986 Test Census—Shipping Problems"
3. June 1986 "Sort Problems with Mail Returns—1986 Census of Central Los Angeles County"
4. November 1986 "1986 Test Census—Hours for Questionnaire Telephone Assistance"
5. December 1986 "Problems Encountered in Quality Control of Keying Operations and Recommended Actions"
6. January 1987 "Administrative Lists and Residential Telephone Files"
7. January 1987 "Documentation of Closing of South Los Angeles Office—1986 Test Census"
8. January 1987 "Problems and Recommendations with the 1986 Pre-Enumeration Survey"
9. January 1987 "1986 Test Census Problems: Mississippi Management Information System"
10. January 1987 "1986 Test Census Reminder Card Problems"
11. January 1987 "Rural Failed Edit Followup Workload—1986 Test Census"
12. January 1987 "1986 Test Census—Hand Adds to Rural Nonresponse Assignment Listings"

### Information Memorandums (1986)

1. May 1985 "Final Collection and Tabulation Geography Requirements for the 1986 Test Census"
2. May 1985 "Titles for 1986 Test Censuses"
3. June 1985 "Proposed Sampling Rate for the 1986 Conventional Test Census"
4. October 1985 "1986 Test Census Form"
5. December 1985 "1986 Test Census Special Place Poster"
6. January 1986 "1986 Test Census Envelopes"
7. February 1986 "1986 Test Census 'Were You Counted?' Forms"
8. February 1986 "1986 Test Census Appointment Record"
9. February 1986 "1986 Test Census 'Introduction for Spanish Speaking Respondents' "
10. March 1986 "1986 Test Census Special Place Envelopes"
11. March 1986 "1986 Test Census Individual and Military Census Report Questionnaires"
12. March 1986 "1986 Test Census Post Office Report of Missing Addresses Form"
13. March 1986 "1986 Test Census Reminder Cards"
14. March 1986 "1986 Test Census Questionnaires and Instruction Guides"
15. March 1986 "1986 Test Census Community Awareness Program—General Population Survey Questionnaire"
16. April 1986 "1986 Test Census Privacy Act Notice for Census Community Awareness Program"
17. April 1986 "1986 Test Census Spanish Questionnaires and Instruction Guides"
18. April 1986 "1986 Test Census 'Were You Counted?' Forms"
19. April 1986 "1986 Test Census Community Awareness Program—Survey of Leaders of Community Organizations"

## Preliminary Research and Evaluation Memorandums (1986)

1. September 1984 "1986 Test Census Rural Prelist Review"
2. October 1985 "1986 Test Census—Quality Control Summary for the Keying of Prelist Address Registers"
3. October 1985 "Results of the Urban Advance Post Office Check for the 1986 Test Census"
4. November 1985 "Some Results of the Rural Prelist Operation for the 1986 Test Census"
5. November 1985 "Evaluation of Prelist Quality Control"
6. February 1986 "Urban Advance Post Office Check: Cost Data and Counts of Uncodable Addresses"
7. March 1986 "Results from the Mississippi Automated List Test"
8. May 1986 "Report on Observation of Census Focus Groups Held Before the 1986 Test Censuses"
9. May 1986 "1986 Census Community Awareness Program (CCAP) General Population Survey—Select Primary Findings"
10. May 1986 "Preliminary Evaluation of the Rural Prelist for the 1986 Test Census"
11. May 1986 "Some Results of the Rural APOC and APOC Reconciliation for the 1986 Test Census"
12. May 1986 "1986 Test Census of Central Los Angeles County—Management Study of Nonresponse Followup Assignment Preparation"
13. May 1986 "Results of the Addressing of Rural Reminder Cards"
14. June 1986 "Management Study of Keying Operations for Long and Short Questionnaires"
15. June 1986 "Management Study of Edit Review"
16. June 1986 "1986 Test Census—Laguna Niguel Processing Office: Report of Management Study of Short Form Microfilming"
17. June 1986 "1986 Test Census of Central Los Angeles County—Report of Management Study of Basic Processing Check-In Operations and Camera Preparation of Questionnaires"
18. June 1986 "Outreach Focus Group Reports From the 1986 Test Census of Central Los Angeles County, California"
19. July 1986 "1986 Test Census Advance Post Office Check: Quality Control Results for the Casing Operation"
20. July 1986 "1986 Test Census of Central Los Angeles County—Report of Management Study of Nonresponse Followup Assignment Control"
21. July 1986 "Quality Control Results for the Printing, Assembly, and Addressing of Questionnaires (Jeffersonville)"
22. July 1986 "1986 Test Census of Central Los Angeles County—Report of Management Study of Special Place Prelist Enumeration"
23. August 1986 "1986 Test Census—Results of the ACF Update Keying Operation (Precanvass)"
24. September 1986 "Management Studies of Personal-Visit Reinterviews—Nonresponse Followup"
25. September 1986 "Results of the Printing, Addressing, and Assembly of the Questionnaires"
26. September 1986 "Work Measurement Study of Name Keying and Sample Write-In Keying in the 1986 Test Census of Central Los Angeles County"
27. September 1986 "OMSD Work Measurement Report, 'Rural Precanvass Enumeration,' OMSD Report 1990-17"
28. September 1986 "1986 Test Census of East Central Mississippi—Report of Management Study of Nonresponse Followup Assignment Preparation, OMSD Report 1990-18"
29. September 1986 "Work Measurement Study Reports of Edit Followup Assignment Control"
30. September 1986 "Work Measurement Study of Edit Review for East Central Mississippi"
31. October 1986 "OMSD Work Measurement Report Rural, 'Precanvass Processing—Prekeying Clerical Preparation and Address Control File (ACF) Updating,' OMSD Report 1990-20"
32. October 1986 "Effects of Mail Reminder Cards on Return Rates in the 1986 Census of Central Los Angeles City"
33. October 1986 "Report on the Results of the 1986 Motivational Inserts Experiment"
34. November 1986 "1986 Test Census Evaluation—The Performance and Utilization of the Quality Control Data Collection System"
35. November 1986 "1986 Test Census Surname Keying: Quality Assurance Results"
36. November 1986 "Results of the Reinterview for the 1986 Nonresponse Followup Operation"
37. November 1986 "Results of the 1986 Electrostatic Plotter Test"
38. December 1986 "Comparison of the Completeness of Groomed and Ungroomed Data on FOSDIC Short-Form Questionnaires: 1986 Urban Data Conversion Evaluation Study"



39. January 1987 "Evaluation of Appointment Card During the 1986 Test Census Nonresponse Followup Operations"
40. January 1987 "Management Studies of Questionnaire Check-In and Related Operations in the 1986 Census of East Central Mississippi"
41. January 1987 "1986 Storefront Evaluation"
42. February 1987 "OMSD Motion and Time Study Report, 'Group Quarters Enumeration—1986 Test Census of East Central Mississippi and Central Los Angeles County,' OMSD Report 1990-23"
43. January 1987 "OMSD Motion and Time Study Report, 'Failed-Edit Followup Enumeration—1986 Test Census of East Central Mississippi,' OMSD Report 1990-24"
44. February 1987 "Evaluation of Orientation (Motivational) Training"
45. February 1987 "Results of Reinterview of Nonhousehold Sources Followup—Central Los Angeles County"
46. February 1987 "Quality Control Results for Individual and Military Census Reports"
47. February 1987 "'86 Test Census-Results of the Address Control File Software Evaluation (Rural)"
48. March 1987 "Executive Summary of the Report: The Census Community Awareness Program and Evaluation of the Potential and Actual Effectiveness of CCAP Based on Evidence"
49. March 1987 "Comparison of Add Rates of Precanvass Suppressed Units for Single and Multi-Units"
50. April 1987 "1986 Test Census—Telephone Assistance Operation"
51. April 1987 "OMSD Motion and Time Study Report, 'Update/Leave Enumeration—1986 Test Census of East Central Mississippi,' OMSD Report 1990-25"
52. May 1987 "Evaluation of Block Split Operation"
53. April 1987 "Report on the Validity of the Automated Data Transcriber Test for Hiring Decennial Keyers"
54. May 1987 "Automated Post-Enumeration Survey Evaluation Report"
55. May 1987 "Some Results From Precensus Coverage Improvement Operations in the 1986 Test Census of Central Los Angeles County"
56. May 1987 "Preliminary 1986 Test Census Results for the Nonhousehold Sources Program and Recommendations for 1990"
57. June 1987 "Results of the 1986 Structure Respondent Test"
58. June 1987 "1986 Test Census General Clerical Coding Quality Assurance Results"
59. June 1987 "1986 Test Census Name Keying Operation Quality Assurance Results"
60. July 1987 "Central Los Angeles County PES—Intraclass Correlation for P-Sample Nonmatches and Erroneous Enumerations"
61. July 1987 "Preliminary Results of Failed Edit Evaluation: Continued Calling"
62. July 1987 "Effect of Edit, Telephone Followup, and Personal Visit on Nonresponse Rates for Population Items in the Los Angeles and Tampa Test Censuses"
63. September 1987 "Status Report on Identifying Hard-to-Enumerate Areas"
64. September 1987 "Motion and Time Study of Nonresponse Followup Enumeration—Central Los Angeles County and East Central Mississippi"
65. September 1987 "Evaluation of Incentive Pay During Nonresponse Followup, 1986 Test Census"
66. October 1987 "Quality Control Operations for the 1986 Post-Enumeration Survey"
67. October 1987 "Evaluation of Delete Rules for the 1985 and 1986 Test Censuses"
68. November 1987 "Participant Observation Research in 1986 and 1988"
69. November 1987 "1986 Test Census Evaluation of Nonresponse Followup Assignment Registers (TAR areas)"
70. November 1987 "1986 Test Census Industry and Occupation Coding Results"
71. January 1988 "Motion and Time Study Report of Edit Followup (Phase 1) for the 1986 Census of Central Los Angeles County"
72. January 1988 "Motion and Time Study Report of Nonhousehold Sources Enumeration for the 1986 Census of Central Los Angeles County"
73. February 1988 "Results of Envelope Testing in the 1986 National Content Test"
74. May 1989 "Review of Duplicate and Erroneous Enumerations Identified in the 1986 Los Angeles Post-Enumeration Survey"
75. July 1989 "Results of Classroom Testing for the Questionnaire Design Program"
76. March 1990 "Results of the Unit Status Review Evaluation"

## **NATIONAL CONTENT TEST (1986)**

1. March 1986 "Summary of 1986 National Content Test Design and Status"
2. March 1986 "1986 National Content Test Privacy Act Notice"
3. April 1986 "National Content Test—Program Title Guidelines"
4. April 1986 "National Content Test Envelopes"
5. April 1986 "National Content Test Questionnaires and Instruction Guides"

## **1987 TEST CENSUSES**

### **Decision Memorandums (1987)**

1. November 1986 "Potential 1987 Test Census Sites"
2. April 1986 "Cancellation of Precanvass in the 1987 Test Census"
3. [Not Issued]
4. April 1986 "1987 Test Census Plans"
5. June 1986 "Guidelines for Development of Public Use Forms—1987 Test Census"

### **Information Memorandums (1987)**

1. January 1986 "Title for 1987 Test Census"
2. March 1986 "1987 Test Census Privacy Act Notice"
3. June 1986 "Review Procedures for 1987 Test Census Outreach Materials"
4. December 1986 "Operation Requirements Overview: Casing and Time-of-Delivery Field Coding Checks, Mail Reminder Card, and Conventional Questionnaire Delivery"
5. December 1986 "Operations Requirements Overview: Post-Enumeration Survey"
6. February 1987 "Operations Requirements Overview: Sampling"
7. January 1987 "Special Place Operations"
8. January 1987 "Post-Enumeration Post Office Check Requirement Overview"
9. January 1987 "Conventional Enumeration and Followup Work Flow"
10. January 1987 "Mailout/Mailback Check-In and Nonresponse Followup"
11. January 1987 "1987 Test Census—Data Capture Operations"
12. January 1987 "1987 Test Census Envelopes"
13. February 1987 "Field Followup Activities and Work Flow for the Mailout/Mailback Area"
14. February 1987 "1987 Post-Enumeration Post Office Check (PEPOC) Reconciliation"
15. March 1987 "Postcensus Local Review Operations"
16. February 1987 "1987 Test Census Envelopes"
17. February 1987 "1987 Test Census Data Quality Assurance, Content and Coverage Edit, and Telephone Followup Requirements Overview"
18. February 1987 "1987 Test Census Search/Match Requirements Overview"
19. March 1987 "Outreach Program"
20. March 1987 "1987 Test Census Requirements Overview, Tabulation/Publication"
21. March 1987 "Questionnaire Printing, Addressing, Assembly, Self-Mailer"
22. March 1987 "1987 Block Splits Overview"
23. March 1987 "1987 Overview Requirements, Package Collection Control System and Field Administration"
24. April 1987 "1987 Test Census Address Control File Requirements Overview"
25. May 1987 "1987 Test Census—Detail File Creation"

### **Preliminary Research and Evaluation Memorandums (1987)**

1. October 1986 "Quality Control Results of the Rural Advance Post Office Check Ink-Jet Labeling Operation"
2. October 1986 "1987 Test Census—Verification Results for the Prelist Keying Operation"
3. January 1987 "Prelist Quality Control Results"
4. January 1987 "Quality Control Results for the APOC Keying"
5. February 1987 "Results of the APOC and APOC Reconciliation for the Test Census"

6. March 1987 "Cost Data for APOC/APOC Reconciliation"
7. May 1987 "Work Measurement Study of the Merge Operation in North Dakota"
8. May 1987 "Quality Assurance Evaluation of the Self-Mailer Package"
9. June 1987 "Quality Control Results of the Printing/Construction of the Envelopes Used in Mailing Package (Outgoing & Return)"
10. July 1987 "Results of the Printing and Binding of the 1987 FOSDIC Questionnaires (Forms DF-1A, DF-2A, and DF-2)"
11. July 1987 "Evaluation of Refusal Record During the 1987 Test Census Nonresponse Followup Operation"
12. July 1987 "Trip Report from List/Enumerate Operation in the 1987 Test Census"
13. August 1987 "Quality Assurance Results for the Addressing of the Post-Enumeration POC Card"
14. August 1987 "Quality Control Results for the APOC Postal Operations"
15. October 1987 "Results of the 1987 Test Census Casing/TOD [time of delivery] Operations"
16. October 1987 "Evaluation of the Prelist Operation for the 1987 Test Census of North Central North Dakota"
17. October 1987 "Personal Visit and Telephone Callbacks in 1987 Test Census of North Central North Dakota"
18. October 1987 "Quality Assurance Results for the Assembly and Addressing of the Long Form FOSDIC Questionnaires"
19. October 1987 "Quality Assurance Results of Clerical Edit"
20. February 1988 "Results of the Search/Match Procedure"
21. March 1988 "1987 Test Census Industry and Occupation Coding Quality Assurance Results"
22. March 1988 "1987 Test Census Quality Control Results for the Casing Operation"
23. April 1988 "Keying of 1987 Industry and Occupation Coding Quality Assurance Results"

#### **Special Urban Survey Design Memorandum (1987)**

1. May 1987 "Summary of 1987 Special Urban Survey Design"

#### **1988 DRESS REHEARSAL**

##### **Design Memorandums (1988)**

1. March 1987 "Design of the Dress Rehearsal Advance Post Office Check (APOC) and APOC Reconciliation"
2. June 1988 "List/Enumerate Address Register Keying for the 1988 Dress Rehearsal"

##### **Information Memorandums (1988)**

1. May 1986 "Selection of 1988 Dress Rehearsal Sites"
2. June 1986 "Titles for 1988 Dress Rehearsal"
3. February 1987 "Operation Requirements Overview: Prelist"
4. March 1987 "Prelist Processing Operations Requirements Overview"
5. April 1987 "Map Production"
6. April 1987 "The Update of the TIGER File"
7. April 1987 "Advance Post Office Check (APOC) Reconciliation, Field and Processing Operation Requirements Overview"
8. April 1987 "Precanvass Field Operation Requirements Overview"
9. May 1987 "Address List Acquisition"
10. May 1987 "Field Administration"
11. May 1987 "APOC Requirements"
12. June 1987 "Field Coding Field Operations"
13. August 1987 "Precensus Local Review"
14. July 1987 "Special Place Prelist Requirements Overview"
15. July 1987 "Group Quarters Enumeration Requirements Overview"
16. August 1987 "TAR Geocoding and ACF Structuring"
17. September 1987 "Operation Requirements Overview: Management Information System"
18. [Not Issued]

19. August 1987 "Kit Preparation"
20. August 1987 "Bar Code Label"
21. September 1987 "Operation Requirements Overview: 1988 Dress Rehearsal Promotion Program"
22. September 1987 "Cancellation of 1988 Dress Rehearsal Motivational Insert Test"
23. September 1987 "Operation Requirements Overview: 1988 Dress Rehearsal Field Followup"
24. October 1987 "Requirements Overview: Precanvass Processing Operations"
25. November 1987 "Operation Requirements Overview: Content and Coverage Edit and Telephone Followup"
26. November 1987 "Operation Requirements Overview: Nonresponse Followup Field Operation"
27. December 1987 "Post-Enumeration Survey 1988 Dress Rehearsal Requirements Overview"
28. December 1987 "Operation Requirements Overview: List/Enumeration, Including PEPOC Reconciliation"
29. January 1988 "Operation Requirements Overview: Sampling"
30. January 1988 "Operation Requirements Overview: Yellow Card Field Coding—Precanvass Reconciliation"
31. January 1988 "Operation Requirements Overview: Update/Leave"
32. January 1988 "1988 Dress Rehearsal: Schedule for Data Products and Related Operations"
33. March 1988 "Operation Requirements Overview: Data Capture System"
34. February 1988 "Operation Requirements Overview: Search/Match Operation"
35. February 1988 "Operation Requirements Overview: Questionnaire Printing, Addressing, and Assembly"
36. February 1988 "Operation Requirements Overview: Collection Control System"
37. March 1988 "Operation Requirements Overview: Processing Office Administration"
38. March 1988 "Operation Requirements Overview: Casing and Time of Delivery"
39. April 1988 "Operation Requirements Overview: Detail File Creation"
40. May 1988 "Operation Requirements Overview: 'Were You Counted?' "
41. May 1988 "Operation Requirements Overview: Industry and Occupation and General Coding"
42. May 1988 "Operation Requirements Overview: Block Splits"
43. May 1988 "Excluding Camden and Morgan Counties from the Post Enumeration Post Office Check (PEPOC) for the 1988 Dress Rehearsal"
45. August 1988 "Operation Requirements Overview: Post-Enumeration Post Office Check"
46. September 1988 "1988 Dress Rehearsal Data Products"
47. November 1988 "Data Control System, Including the Control and Tracking System Description"
48. December 1988 "Operation Requirements Overview: Tabulation/Publication Program Public Law 94-171 Data Requirements"
49. March 1989 "Operation Requirements Overview: Tabulation/Publication Program"
50. September 1989 "Operation Requirements Overview: Place-of-Birth, Migration, Place-of-Work Coding"
51. March 1989 "Unclassified Housing Units—1988 Dress Rehearsal as Compared to 1980 and 1990 Definitions"

#### **Preliminary Research and Evaluation Memorandums (1988)**

1. June 1987 "Use of the Geographic Game Board for Map-Use Training"
2. July 1987 "Quality Assurance Results for the Printing and Packaging of the Advance Post Office Check Cards"
3. December 1987 "Management Study of Urban Precanvass Enumeration"
4. January 1988 "Results of the APOC for the 1988 Dress Rehearsal (Prelist Area)"
5. February 1988 "Results of the Special Followup of APOC Duplicates in East Central Missouri"
6. March 1988 "Results of the 1988 Dress Rehearsal APOC Reconciliation"
7. January 1989 "Census Content Data Quality Evaluation"
8. May 1988 "Quality Assurance Results for the Addressing of the Yellow Cards (DX-374) in Jeffersonville"
9. April 1988 "Prelist Keying—Quality Assurance Results"
10. August 1988 "Management Study of Clerical Edit, 1988 Census of Eastern Washington State"
11. August 1988 "Preliminary Results From the 1988 Self-Mailer Questionnaire Package Evaluation"
12. September 1988 "Quality Assurance Results of the Check-In of Questionnaires in the Processing Office"
13. September 1988 "Preliminary Report on Unit-Status Change Results From the Nonresponse Followup Reinterview Program (1988 Dress Rehearsal)"
14. October 1988 "1988 Dress Rehearsal—APOC Keying Quality Assurance Results"

15. October 1988 "Quality Assurance Results for the Addressing of the Traditional Mailing Packages (Evaluation of the Non-Self-Mailer Package)"
16. December 1988 "Summary of Quality Assurance (QA) Operations to Validate the FOSDIC Film Storage Boxes"
17. December 1988 "Analysis of Long-Form Shipping and Related Data-Capture Problems"
18. December 1988 "Quality Assurance Results of 1988 Dress Rehearsal Clerical Edit Operation"
19. January 1989 "Quality Assurance Results for the Printing of the Enumerator-Administered Short-Form FOSDIC Questionnaire"
20. January 1989 "Results of the 1988 Dress Rehearsal Precensus Local Review Operation"
21. February 1989 "Preliminary Data for the Dress Rehearsal Vacant/Delete Review Operation"
22. February 1989 "Results of the 1988 Dress Rehearsal PEPOC and PEPOC Reconciliation"
23. April 1989 "1988 Casing Quality Assurance Results"
24. May 1989 "Quality Assurance Results for the Printing and Binding of the Long-Form Enumerator-Administered Questionnaires"
25. May 1989 "1988 Dress Rehearsal Telephone Followup Quality Assurance Results—Monitoring and Resolution"
26. June 1989 "Quality Assurance Results of the 1988 Dress Rehearsal Search/Match Operation"
27. June 1989 "1988 Dress Rehearsal—Collection Control File (CCF) Key Evaluation"
28. June 1989 "1988 Dress Rehearsal Quality Assurance Results—Repair"
29. June 1989 "Personal Visits and Telephone Callbacks in the Dress Rehearsal: Columbia and Saint Louis, Missouri, and Washington"
30. June 1989 "Evaluation of the Prelist Operation for the 1988 Dress Rehearsal Sites of Eastern Washington and East Central Missouri"
31. June 1989 Results of the 1988 Dress Rehearsal Postcensus Local Review Operation"
32. July 1989 "1988 Dress Rehearsal—Group Quarters Keying Evaluation"
33. August 1989 "1988 Dress Rehearsal—Sample Write-In Long-Form Data-Entry Keying Evaluation"
34. August 1989 "1988 Update/Leave—Quality Assurance Results"
35. August 1989 "Quality Assurance Results for the Printing, Addressing, and Assembly of the Self-Mailer Package"
36. August 1989 "1988 List/Enumerate—Quality Assurance Results"
37. August 1989 "Quality Assurance Results for the 1988 Dress Rehearsal FACT 90 Preparation Operation"
38. August 1989 "Quality Assurance Results for the 1988 Dress Rehearsal General Coding Operation"
39. August 1989 "1988 Dress Rehearsal Edit Review Quality Assurance Results—Diary Split Operation"
40. September 1989 "1988 Dress Rehearsal Industry and Occupation Coding Quality Assurance Results—First Run"
41. October 1989 "Preliminary Results from the Search/Match Operation and the Military Census Report Special Evaluation in the 1988 Dress Rehearsal"
42. October 1989 "1988 Dress Rehearsal Markup Quality Assurance Results"
43. October 1989 "Summary of Quality Assurance Results for 1988 Dress Rehearsal Procedural Change Implementation"
44. November 1989 "1988 Dress Rehearsal Results of the Verification of the Public Law 94-171 Computer-Generated Listings of the Tabulation and Publication System"
45. November 1989 "Quality Assurance Results for the Printing and Finishing of the Individual Census Report and Military Census Report Keyed Questionnaires and the Spanish Instruction Guide"
46. December 1989 "Preliminary Unit-by-Unit Precanvass Results from the 1988 Dress Rehearsal"
47. December 1989 "Evaluation of the 1988 Dress Rehearsal Casing/TOD Check (Prelist Areas)"
48. December 1989 "Mail Return Rates for the 1988 Dress Rehearsal of St. Louis, Missouri, East Central Missouri, and Eastern Washington"
49. December 1989 "Results of the 1988 Dress Rehearsal Update/Leave Evaluation"
50. January 1990 "1988 Dress Rehearsal Industry and Occupation Coding—Comparison of Two Automated Coding Runs"
51. January 1990 "1988 Nonresponse Followup Reinterview Results"
52. July 1990 "1988 Dress Rehearsal Followup: Place-of-Birth, Migration and Place-of-Work Coding Quality Assurance Results"
53. February 1991 "Documentation of the 1988 Dress Rehearsal Post Enumeration Survey"
54. February 1991 "Evaluation Followup for the 1988 Post-Enumeration Survey"
55. February 1991 "Quality Assurance for the 1988 Dress Rehearsal Post-Enumeration Survey"

- 56. April 1991 "Results of the Vacant/Delete Review Evaluation for the 1988 Dress Rehearsal"
- 57. December 1991 "Results of the 1988 National Census Test"

## 1990 CENSUS

### Address List Development Memorandums (1990)

- 1. January 1986 "Establishment of New Memorandum Series"
- 2. April 1986 "Analysis of Commercial Address List Vendor Survey"
- 3. June 1986 "Use of Local List for 1990 Address List Development Activities in Urban and Rural Areas"
- 4. June 1986 "1990 Address List Compilation Methodology for the Rural Mail Areas"
- 5. September 1986 "The Use of Vendor Files for Address List Compilation for Urban Areas"
- 6. September 1986 "Address List Development for the 1990 Census"
- 7. May 1987 "1990 Address List Postal Update Methodology for Urban and Rural Mail Areas—Summary of Testing Program"

### Administrative Memorandums (1990)

- 1. June 1983 "Census Managers, by Division"
- 2. August 1983 "Census Managers, by Division"
- 3. [Not Issued]
- 4. October 1987 "Interdivisional Memoranda Series"
- 5. March 1988 "New Decennial Memorandum Series (N.E.C.)"

### Data Products Planning Memorandums (1990)

- 1. May 1986 "Establishment of New Memorandum Series"
- 2. July 1986 "1990 Tabulation and Publication Management Information System (MIS) Schedule and Definitions"
- 3. July 1986 "Final Review of the 1980 Decennial Census Tabulation, Publication, and Dissemination Program"
- 4. December 1986 "1990 Printed Report Components Prototype"
- 5. February 1987 "Long-Range Plan for 1990 Data Products"
- 6. March 1987 "User Requirements and Recommendations for 1990 Census Data Products"
- 7. April 1987 "1990 Census Planning: Dissemination Media and Methods for the Tabulation and Publication Program"
- 8. April 1987 "1988 Dress Rehearsal Data Products"
- 9. July 1987 "User Requirements and Recommendations for 1990 Census Geographic Data Products"
- 10. August 1987 "Selection of Spectra Font for 1990 Decennial Census Publication"
- 11. February 1988 "Dissemination of 1990 Data Products"
- 12. July 1988 "1990 Disclosure-Avoidance Methodology"
- 13. October 1988 "Test States for Review and Clearance of 1990 Census Data Products"
- 14. November 1988 "Final List of Data Products for the 1990 Census Tabulation and Publication Program"
- 15. November 1988 "Final List of Maps for the 1990 Census Data Products"
- 16. November 1988 "Schedule for Preparation of Specifications for 1990 Census Data Products"
- 17. April 1989 "Sampling Rate and Data Products for Minnesota Townships"
- 18. May 1989 "Results of New Dissemination Media Research and 1990 Data Products Plans"
- 19. June 1989 "1990 Census Data Products Planning: Data Product Information and Promotion Program"
- 20. December 1989 "Data Product Information and Promotion Program: Informational Series of Brochures and Booklets"
- 21. March 1990 "Effect of Potential Adjustment on 1990 Census Pretabulation Processing and the Tabulation and Publication Program"
- 22. May 1990 "Final Generic Work Flow for Data Products"
- 23. "1990 Census Standard Data Product Acknowledgement"
- 24. November 1990 "Final Schedule for the 1-Percent and 5-Percent Public Use Microdata Sample Files"
- 25. November 1990 "Disclosure Avoidance for Special Tabulations"



## Decision Memorandums (1990)

1. May 1984 "Discontinuance of Research on LORAN-C for the 1990 Census"
2. November 1984 "Decision to Conduct a Public-Service Advertising Campaign for the 1990 Census"
3. October 1985 "Certification Policy for the 1990 Test Censuses Program"
4. January 1986 "Census Bureau Position on the Use of Optical Mark Recognition Technology for the 1990 Decennial Census"
5. [Not issued]
6. March 1986 "Creation and Updating of the 1990 Local Review Mail List File"
7. May 1986 "1990 Decennial Census—Address Compilation, Update, Questionnaire Delivery for Non-Tape Address Register Areas"
8. June 1986 "Discontinuation of the H4 Coverage Kit"
9. June 1986 "1990 Decennial Census—Advance Listing for Prelist"
10. July 1986 "1990 Decennial Census—Use of Unit Control for the Enumeration of Land-Based Military Personnel in the United States and Puerto Rico"
11. July 1986 "Use of a Single Sample-Data Collection Form in the 1990 Decennial Census"
12. August 1986 "Decision Parameters from Decennial Census Decision Conference II"
13. October 1986 "Prelist Procedures for the 1990 Decennial Census"
14. January 1987 "1990 Enumeration of Military Crews of Vessels"
15. October 1986 "Use of a Short-Form Individual Census Report (ICR) for T-Night Enumeration"
16. November 1986 "Decision 86: Documentation of Decisions on Major Milestones for the 1990 Decennial Census"
17. January 1987 "Change in Precanvass Householder Name Recording for the 1988 Dress Rehearsal and 1990 Census"
18. March 1987 "1990 Local Review Program—Post-Review Counts"
19. March 1987 "Processing the Stateside Spanish Questionnaires for the 1990 Census"
20. March 1987 "Update/Enumeration"
21. May 1989 "Procedures for Handling Late Mail Returns (LMRS) in Dress Rehearsal and in the 1990 Census"
22. March 1987 "Design of the 1990 Advance Post Office Check (APOC) and APOC Reconciliation"
23. [Not issued]
24. May 1987 "Tabulation of Data for American Indian Trust Lands"
25. May 1987 "Specifications for Handling Prelist Clusters in the 1990 Census"
26. May 1987 "Sampling Rates for the 1990 Census"
27. June 1987 "Policy on Temporary File Creation for Record Linkage"
28. [Not issued]
29. June 1987 "Cancellation of the Nonhousehold Sources Program"
30. August 1987 "Edit and Telephone Followup of Enumerator Returns"
31. August 1987 "Advance Post Office Check (APOC) Reconciliation Procedures and the Address Control File (ACF) Update Record for the Dress Rehearsal and the 1990 Census"
32. August 1987 "District Office (DO) Procedures for Coding Casing and Time-of-Delivery (TOD) Blue Card Addresses for the Dress Rehearsal and the 1990 Census"
33. August 1987 "National Prelist in the 1988 Dress Rehearsal Sites"
34. September 1987 "1988 Dress Rehearsal (DR) and 1990 Decennial Census Enumeration of Transient Night (T-Night) Places"
35. September 1987 "Updating Addresses During Precanvass for the 1990 Census"
36. September 1987 "Respotting Address Register Area Maps (ARA) and District Office (DO) Procedures for Geographic Transfers for the Dress Rehearsal and the 1990 Census"
37. September 1987 "Cluster Address Register Areas (ARA's)"
38. September 1987 "Contingency Plans for Conducting the Dress Rehearsal and 1990 Census Telephone Followup in the Processing Offices (PO's) and Type 2 and 3 District Offices (DO's)"
39. September 1987 "Failed-Edit Questionnaires—Continued Telephone Operation"
40. September 1987 "Delete Check in Seasonally Vacant Areas for the Dress Rehearsal and the 1990 Census"
41. October 1987 "Overseas Travelers Report"

42. November 1987 "Address Chaining for Tape Address Register (TAR) Areas"
43. December 1987 "1990 Enumeration of Maritime Crews of Vessels"
44. December 1987 "1990 Decennial Census Shelter/Street Night (S-Night) Enumeration"
45. December 1987 "Industry and Occupation Coding: 1988 Clerical Production and Referral Coding Site"
46. December 1987 "Establishment of a Cooperative Program with the Bureau of Indian Affairs, of Interior"
47. April 1988 "Scope of the 1990 Tribal Liaison Program"
48. January 1988 "Address Control File (ACF) Delete Rule and Disposition of Postmaster Returns (PMR's)"
49. March 1988 "Special Places and Late Prelist"
50. March 1988 "Military and Maritime Vessel Mailout and Processing Work Flows for 1990"
51. March 1988 "Multijurisdictional Homeports and Their Assigned Vessels"
52. April 1988 "Usual Home Elsewhere Status (UHE) for Persons in Local Jails/Police Lockups"
53. May 1988 "1990 Shelter/Street Night Letter: D-33L"
54. May 1988 "Decision to Code 100-Percent Write-in Entries in the Race Question"
55. June 1988 "Computer Tapes for the 1990 Local Review Program"
60. September 1988 "Deletion of Special Places During Prelist and Precanvass Operations for the 1990 Census"
61. January 1989 "Monitoring Field Division Research & Experimental (REX) Program, Costs During the 1990 Census"
62. December 1988 "Rules for Accepting Partial Interviews From the Nonresponse Followup"
63. December 1988 "Procedure Modifications for the 1988 Prelist Operation"
64. January 1989 "Modifications to the 1990 Precanvass Operation"
65. March 1989 "Acceptance of Shelter and Street Updates to the Special Place Inventory From Local Governments"
66. April 1989 "Changes for the 1989 Prelist"
67. April 1989 "Address System Change in Biloxi, Mississippi"
68. July 1989 "Languages for the Asian 800 Telephone Questionnaire Assistance (TQA) Numbers"
69. September 1989 "1990 'Shelter and Street' Night Enumeration Procedural Modifications"
70. October 1989 "Proposal for Shelters for Abused Women (or Shelters Against Domestic Violence)"
71. December 1989 "Release of Precensus Local Review Counts to Data Users"
72. March 1990 "1990 'Shelter and Street' Night Enumeration Procedural Modification"
73. March 1990 "Enumeration of Safehouses for Abused Women"

#### Information Memorandums (1990)

1. February 1983 "Dictionary of Terms Related to Decennial Census Methodologies"
2. April 1983 "Summary of the 1980 Evaluation Studies"
3. May 1983 "Schedule of Key Dates for Major 1990 Census Operations"
4. June 1983 "1990 Geography Planning Committee Issues Report"
5. June 1983 "Final Report of the 1990 Planning Committee on Basic Design"
6. June 1983 "1990 Census Redistricting Data Committee Report"
7. June 1983 "Analysis of Census Requirements for LORAN-C"
8. June 1983 "Inventory of Suggestions—1990 Planning Committee Final Report"
9. August 1983 "State-of-the-Art Assessment of LORAN-C"
10. August 1983 "Report on Test of Micrologic ML 5000 LORAN-C Navigator"
11. September 1983 "Report on 1990 Census Planning Questionnaire"
12. September 1983 "Report on Part 2 Test of Micrologic ML 5000 LORAN-C Navigator"
13. September 1983 "Interim Recommendations from 1990 Census Planning Committee for Outreach"
14. October 1983 "Magnavox Presentation on the Global Positioning System (GPS)"
15. October 1983 "Summary of Geostar Satellite System Presentation"
16. December 1983 "1990 Census Requirements Planning Committee—Summary of Survey of Federal Data Users"
17. December 1983 "1990 Census Automation Committee Final Report"
18. December 1983 "1990 Outreach Planning Committee Final Report"
19. December 1983 "Final Report of the 1990 Research Review Committee"

20. January 1984 "1990 Census Planning Committee on Field Operations—Interim Report"
21. February 1984 "1990 Census Requirements Planning Committee—Summary of State Uses of Housing Data"
22. February 1984 "Results of the County Address Systems Survey"
23. February 1984 "Undercount Measurement Methods for 1990"
24. March 1984 "1990 Census Requirements Planning Committee—Data Uses by Federal Agencies and State Governments"
25. April 1984 "Program Plan for the 'Use of the U.S. Postal Service' "
26. April 1984 "Observation Reports"
27. April 1984 "1990 Census Planning Committee on Use of Administrative Records—Final Report"
28. April 1984 "1990 Census Planning Committee on Quality Control—Final Report"
29. May 1984 "Program Plan for the Geographic Support System"
30. September 1984 "Program Plan for Content Evaluation Methodologies"
31. June 1984 "Research Plans on Issues Related to Enumeration Approaches"
32. June 1984 "Program Plan for Processing/Tabulation Methodologies"
33. December 1984 "Revision of Program Plan for Questionnaire Design"
34. July 1984 "Research Plan for Automated Coding"
35. July 1984 "Presentation at the Off-Site Conference on 1990 Planning Review"
36. August 1984 "U.S. Postal Service City/Rural Delivery"
37. August 1984 "Final Report of the 1990 Requirements Planning Committee"
38. August 1984 "Research Plan on Adjustment for the 1990 Decennial Census"
39. August 1984 "Program Plans"
40. August 1984 "Disclosure Avoidance and Confidentiality Working Group—Interim Report"
41. August 1984 "Conference on Telephone Communications in the Federal Government"
42. September 1984 "Program Plan for the Management Information System"
43. September 1984 "Final Report of the 1990 Census Committee on Special Enumeration Procedures"
44. September 1984 "Program Plan for the Use of State and Local Resources"
45. October 1984 "1980 Census Mail Response Rates"
46. October 1984 [Recall of No. 43 for new cover]
47. October 1984 "1990 Census Planning Committee on Field Operations—Final Report"
48. October 1984 "Program Plans for Coverage Improvement, Data Collection Methodology, and Field Administration"
49. November 1984 "Final Report of the 1990 Planning Committee on Coverage Improvement"
50. November 1984 "Final Report of the 1990 Planning Committee on Postal Service Issues"
51. November 1984 "Issue Paper Concerning the Enumeration of Undocumented Aliens in the 1990 Census"
52. December 1984 "Program Plans for the Censuses of Puerto Rico and Outlying Areas"
53. December 1984 "Stakeholders' Conference Report on the Public Law 94-171 Program"
54. January 1985 "Research and Development Plan for Computer-Assisted Enumeration"
55. January 1985 "Final Report of the 1990 Census Committee on Special Enumeration Procedures"
56. January 1985 "Block Boundary Suggestion Project Involving State Governments"
57. January 1985 "Report of the National Geographic Areas Conference"
58. January 1985 "Program Plan for Outreach"
59. February 1985 "Program Plan for Special Enumeration Procedures"
60. February 1985 "Proposal for New 1990 Census Publication Series"
61. March 1985 "Report of the Automation Planning Conference"
62. April 1985 "1985 Census Test Nonresponse Followup Supplement"
63. July 1985 "Report of the Planning Review Conference"
64. August 1985 "Report of the Joint Meeting with Minority Groups"
65. December 1985 "Report of the 1985 Decennial Census Decision Conference"
66. January 1986 "Calculation and Use of Mail-Response Versus Mail-Return Rates"
67. January 1986 "Report of the Regional Geographic Areas Conferences"
68. January 1986 "Report of the Second Planning Review Conference"
69. February 1986 "Progress Report of Field Geographic Training Task Force"
70. October 1986 "MIS Design Workshop Report"

71. July 1988 "Documentation of Mail-Response and Mail-Return Rates"
72. April 1987 "Transmittal to Congress of the 1990 Census Subjects"
73. May 1987 "Report of the Race and Ethnic Items Conference"
74. July 1987 "Proposal for the 1990 Census: Count Review and Data Acceptance Programs"
75. July 1987 "Documentation of Changes in Prelist Scope and Schedule"
76. July 1988 "Operation Requirements Overview: 1990 Prelist"
77. February 1988 "Documentation of Changes in Prelist Schedule and Scope of Related Address-List Development Activities"
78. April 1988 "1988 Congressional Submission"
79. September 1988 "Operation Requirements Overview: Prelist Processing (Final Version)"
80. April 1988 "Prelist Schedule Change"
81. June 1989 "Special Place Prelist"
82. October 1988 "Operation Requirements Overview: Precanvass"
83. June 1988 "Operation Requirements Overview: Address List Acquisition"
84. July 1988 "Operation Requirements Overview: TAR Geocoding"
85. August 1988 "1988 Dress Rehearsal Mail Response Rates"
86. August 1988 "Operation Requirements Overview: 1990 Military and Maritime Enumeration"
87. October 1988 "Operation Requirements Overview: Advance Post Office Check (APOC) Reconciliation Field and Processing Operations"
88. February 1989 "Operation Requirements Overview: Precensus Local Review"
89. June 1989 "Operation Requirements Overview: 1990 Map Production"
90. September 1988 "Operation Requirements Overview: 1990 Update/Leave"
91. March 1989 "Operation Requirements Overview: 1990 Shelter/Street Night and Transient Night Enumeration"
92. January 1989 "Operation Requirements Overview: 1990 Group Quarters Enumeration"
93. January 1989 "Operation Requirements Overview: 1990 Precanvass Processing"
94. October 1988 "Operation Requirements Overview: 1990 Advance Post Office Check (APOC)"
95. November 1988 "Operation Requirements Overview: 1990 Urban Enumeration"
96. November 1988 "Operation Requirements Overview: 1990 Post Enumeration Survey — Listing"
97. November 1988 "Operation Requirements Overview: 1990 Field Coding"
98. December 1988 "Operation Requirements Overview: 1990 Field Followup"
99. December 1988 "Operation Requirements Overview: 1990 Block Splits"
100. May 1989 "Operation Requirements Overview: 1990 Alaska Enumeration"
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105. March 1989 "Operation Requirements Overview: 1990 Nonresponse Followup"
106. March 1989 "Operation Requirements Overview: 1990 Collection Control System Requirements Overview"
107. March 1989 "Operation Requirements Overview: 1990 Postcensus Local Review Requirements Overview"
108. March 1989 "Operation Requirements Overview: 1990 Census Sample Design Requirements Overview"
109. March 1989 "Operation Requirements Overview: 1990 Field Administration Requirements"
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111. May 1989 "Precanvass Processing Requirements Overview"
112. May 1989 "1990 Management Information (MIS) Requirements Overview"
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114. September 1989 "Operation Requirements Overview: Late-Receipt Block Splits"
115. September 1989 "Operation Requirements Overview: FACT 90 Systems Development"
116. September 1989 "Operation Requirements Overview: Telecommunication Systems"
117. November 1989 "Operation Requirements Overview: Address Control System"

118. November 1989 "Operation Requirements Overview: Processing Office Operations"
119. December 1989 "Operation Requirements Overview: Edit Detail File Creation"
120. January 1990 "Major Automation Procurements"
121. January 1990 "Operation Requirements Overview: Count Review/Data Acceptance"
122. February 1990 "FACT Changes"
123. March 1990 "Special Census Procedures (Hurricane Hugo)"
124. March 1990 "Operation Requirements Overview: Search/Match"
125. March 1990 "Releasing Information About Local Government Participation in Decennial Census Activities"
126. March 1990 "Operation Requirements Overview: 'Were You Counted?' Campaign"
127. March 1990 "Questions About Type/Availability of Selected Component Data on the Homeless Population"
128. April 1990 "Early Alert Mailout Flyer"
129. [Not issued]
130. April 1990 "Operation Requirements Overview: Data Control System, including the Control and Tracking System"
131. April 1990 "The 1990 Census Parolee/Probationer Coverage Improvement Program"
132. April 1990 "Mail Response and Return Rates From 1960 to 1990"
133. [Not issued]
134. May 1990 "Operation Requirements Overview: Puerto Rico and Virgin Islands Processing"
135. May 1990 "Operation Requirements Overview: Tabulation/Publication"
136. April 1990 "Recording of Tape Address Register Addresses for Philadelphia Area District Offices"
137. May 1990 "Operation Requirements Overview: Space Acquisition"
138. July 1990 "Operation Requirements Overview: Recanvass (Housing Coverage Check)"
139. July 1990 "Operation Requirements Overview: Pacific Islands Processing"
140. August 1990 "Operation Requirements Overview: Place-of-Birth, Migration, and Place-of-Work Coding"
141. August 1990 "Operation Requirements Overview: Automated Coding (General, Industry and Occupation, and 100-percent Race)"
142. September 1990 "Parolee/Probationer Coverage Improvement Program, Nonresponse Follow-up - Targeted Areas"
143. September 1990 "Releasing Information About Local Government participation in Postcensus Local Review"
144. September 1990 "'Were You Counted?' Campaign"
145. October 1990 "The 1990 Decennial Census Parolee/Probationer Coverage Improvement Followup Program"
146. November 1990 "Conference on Homeless Population Enumeration"
147. November 1990 "1990 Postcensus Local Review: Feedback to Participating Local Governments"
148. May 1991 "1990 Post-Enumeration Survey Requirements Overview"
149. July 1991 "The 1990 Decennial Census Primary Selection Algorithm (PSA) Review"
150. December 1990 "Policy Statement on Release of Census Data Prior to the Adjustment Decision"
151. December 1990 "1990 Procurement Requirements Overview"
152. January 1991 "Operation Requirements Overview: U.S. Postal Service Preparation"
153. February 1991 "Operation Requirements Overview: 'Thank You America' Program"
154. February 1991 "Operation Requirements Overview: Questionnaire Printing, Addressing, and Assembling"
155. February 1991 "Promotion Program Requirements Overview"
156. January 1992 "1990 Census Review Document—Volume 16, Information Management"
157. April 1992 "1990 Census Review Document 4A, Questionnaire Content Development"
158. April 1992 "1990 Census Review Document 4B, Questionnaire Design and Printing"
159. April 1992 "1990 Census Review Document 9A, Statistical Design and Methodology of the Census Sample"
160. June 1993 "1990 Census Review Document 8, Outlying Areas Functional Review"

### Local Review Memorandums (1990)

1. July 1986 "Results of the State Data Center and Federal-State Cooperative for Population Estimates Participation Questionnaire for the 1990 Local Review Program"
2. August 1986 "Initial 1990 Local Review Mailout to Local Officials"
3. February 1987 "Conducting the 1990 Local Review"
4. March 1987 "Roles and Responsibilities for the Regional Office, State Data Center, and Federal State Cooperatives for Population Estimates in the 1990 Local Review Program"

### Outlying Areas Decision Memorandum (1990)

1. November 1987 "Geographic Scope and District Office Locations for the Outlying Areas"

### Outreach Memorandums (1990)

1. September 1985 "Establishment of Outreach Memoranda Series"
2. October 1985 "Advance Conference Reports"
3. January 1986 "Meeting Notes from the 1986 Outreach Committee"
4. March 1986 "Notes from the January 1986 Outreach Committee Meetings"
5. March 1986 "1986 Test Census Outreach Plan"
6. March 1986 "Status Report of the 1986 Census Test Outreach Program"
7. March 1986 "Notes from the February 1986 Outreach Committee Meeting"
8. April 1986 "Report of the 1986 Los Angeles Community Meeting with the Asian-American Community—February 12, 1986"
9. April 1986 "Status Report of the 1986 Census Test Outreach Program"
10. May 1986 "Status Report of the 1986 Census Test Outreach Program"
11. June 1986 "Notes From the March 1986 Outreach Committee Meeting"
12. June 1986 "Report of Regional Meeting on the 1990 Census with the Southeast American Indian Communities and the Census Bureau, Nashville, TN, February 20, 1986"
13. June 1986 "Status Report of the 1986 Test Census Outreach Program"
14. July 1986 "Report of the 1987 Site Selection Consultation Conference, Arlington, VA, August 26-27, 1985"
15. August 1986 "Status Report of the 1986 Test Census Outreach Program"
16. September 1986 "Regional Indian Meeting With the Northern and Central California and Hawaiian American Indian Communities and the Census Bureau, Sacramento, CA, December 3, 1985"
17. September 1986 "Regional Meeting With the Southern California American Indian Communities and the Census Bureau, San Diego, CA, December 5, 1985"
18. September 1986 "Status Report of the 1986 Test Census Outreach Program"
19. October 1986 "Meeting of Census Bureau Staff With Members of the Asian-American Community, San Francisco, CA, April 3, 1986"
20. October 1986 "Report of the Regional Meeting on the 1990 Census With the Northeast American Indian Communities and the Census Bureau, Boston, MA, May 29, 1986"
21. May 1987 "Report of the Regional Meeting on the 1990 Census With the Northern Plains American Indian Communities and the Census Bureau, Bismarck, ND, August 8, 1986"
22. May 1987 "Meeting of the Census Bureau Staff with Representatives of the Detroit Community"
23. June 1987 "Meeting of the Census Bureau Staff with Representatives of the Oakland Community"
24. July 1987 "Meeting of Census Bureau Staff with Representatives of the Hartford Community"
25. September 1987 "Meeting of Census Bureau Staff with Representatives of the Los Angeles Community"
26. September 1987 "Report of the Regional Meeting on the 1990 Census With the Great Lakes American Indian Communities and the Census Bureau, Minneapolis, MN, August 5, 1986"
27. September 1987 "Meeting of Census Bureau Staff With Representatives of the Philadelphia Community"
28. November 1987 "Meeting of Census Bureau Staff With Representatives of the Atlanta Community"
29. December 1987 "Meeting of Census Bureau Staff With Representatives of the New Orleans Community"
30. December 1987 "1990 Census Education Project Components, Distribution, and Promotion Plan"



31. February 1988 "Mail Reminder Card"
32. January 1988 "Community Action Guide for the 1988 Dress Rehearsal"
34. December 1988 "1990 Endorsements"
35. January 1989 "National Head Start Initiative Memorandum of Understanding"

#### Planning Memorandums (1990)

1. October 1982 "Key Dates"
2. January 1983 "Communications Related to the Planning of the 1990 Census"
3. January 1983 "1990 Geographic System"
4. June 1983 "Proposed 1983 Stakeholders' Conference on Public Law 94-171"
5. September 1983 "Coordination of Local Public Meetings (LPM's) with Geographic Outreach Activities"
6. October 1983 "Digitizing of Map Spots"
7. October 1983 "1990 Census Annual Report for Dissemination to the Public"
8. December 1983 "Issue Paper on the Bureau's Role in the Rural Address Conversion Movement"
9. December 1983 "1990 Census Planning Schedule"
10. December 1983 "Designation of Division Liaisons"
11. January 1984 "Block Numbering the Entire Country for 1990"
12. February 1984 "Meeting with AT&T [American Telephone & Telegraph Co.] to Discuss Development of a National Telephone File"
13. February 1984 "Local Public Meetings (LPM's)"
14. March 1984 "1985 Pretest Memoranda Series"
15. February 1984 "1990 Content and Products Development Task Force"
16. March 1984 "Preliminary 1985 Pretest Processing Configuration"
17. March 1984 "Housing-Unit and Population Projections for 1990"
18. April 1984 "Schedule of 1990 Census Local Public Meetings for 1984"
19. January 1986 "Report of the Geographic Operations Task Force"

#### Policy Memorandums (1990)

1. August 1983 "Review Process for Field Manuals and Procedures"
2. December 1983 "Forms Numbering Policy for 1990 Census, Dress Rehearsal, Tests, and Pretests"
3. October 1985 "1990 Census Tract and Block Numbering Area Programs"
4. November 1985 "Recognition of American Indian Reservations for Participation in Geographic Programs"
5. May 1986 "1990 Test Censuses and the Dress Rehearsal: Guidelines for the Tabulation and Publication Program"
6. February 1987 "1990 Decennial Census Management Information System"
7. March 1987 "1990 Census Outreach Activities: Acknowledgments for Persons Participating in Census Programs"
8. [Not issued]
9. May 1987 "Objectives for the 1990 Decennial Census"
10. [Not issued]
11. [Not issued]
12. October 1987 "Enumeration and Residence Rules for the 1990 Census"
13. December 1987 "1988 Dress Rehearsal and 1990 Census Apportionment Count Certification"
14. April 1988 "Privacy Act Notices"
15. August 1988 "1990 Census: Presentation of Information for American Indian and Alaska Native Areas in Data Products"
16. February 1989 "1990 Decennial Census Quality Assurance"
17. [Not issued]
18. August 1990 "Availability of Postcensus Local Review Counts and Maps"  
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19. November 1989 "Dissemination of Information on the 1990 Census Disclosure-Avoidance Methodology"
20. December 1989 "Use of Administrative Lists to Improve Population Coverage"
21. December 1989 "Use of Local Lists to Improve Housing-Unit Coverage"
22. December 1989 "The Enumeration of Doubled-Up Families"

23. February 1990 "Release of Mail-Response Rates"
24. April 1990 "Release of Census Counts"
25. July 1990 "Security for PES Materials and Operations"
26. November 1990 "Disclosure Avoidance for Special Tabulations"
27. [Canceled]
28. February 1991 "Controlling the Distribution of Address Control File (ACF) and/or Data Capture File (DCF) Tabulations"
29. February 1991 "Policy for Count Question Resolution and 1990 Census Errata"
30. September 1991 "Policy for Correcting Geographic/Coverage Errors Through the Count Question Resolution and 1990 Census Errata Process"
31. [Not issued]
32. November 1991 "1990 Census Adjusted Redistricting Data"
33. [Undated] "Responding to External Requests for Information About Special Services"

**Prelist Memorandums (1990)**

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2. April 1987 "Revised 1990 Prelist Wave Schedule"

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# SELECTED ABBREVIATIONS AND ACRONYMS RELATED TO CENSUS GEOGRAPHY

ACF	Address Control File	GTUB	geographic tabulation unit base
ACG	Address Coding Guide	GU	governmental unit
ANRC	Alaska Native Regional Corporation	GUS	Geographic Update System
ANV	Alaska Native village	MA	metropolitan area
ANVSA	Alaska Native village statistical area	MAW	metropolitan area window
ARA	address register area	MCD	minor civil division
BAS	Boundary and Annexation Survey	MMS	Metropolitan Map Series
BG	block group	MOU	memorandum of understanding
BIA	Bureau of Indian Affairs	MPO	metropolitan planning organization
BLM	Bureau of Land Management	MRF	Master Reference File
BNA	block numbering area	MSA	metropolitan statistical area
CCD	census county division	OMB	Office of Management and Budget
CD	congressional district	P.L.	Public Law
CDP	census designated place	PMSA	primary metropolitan statistical area
CFCC	census feature class code	PUMA	public-use microdata area
CIM	collection insertion map	RALS	random access logical subfile
CMSA	consolidated metropolitan statistical area	RCC	regional census center
CSAC	census statistical areas committee	RO	regional office
DLG	Digital Line Graph	SCO	State certifying official
DO	district office	SLF	summary level file
DOD	Decennial Operations Division	TAR	tape address register
DPD	Data Preparation Division	TAZ	traffic analysis zone
ED	enumeration district	TDSA	tribal designated statistical area
FCM	feature change map	TEA	type-of-enumeration area
FDS	field digitizing site	TIGER	Topologically Integrated Geographic Encod- ing and Referencing
FIPS	Federal Information Processing Standard	TJSA	tribal jurisdiction statistical area
FLD	Field Division	TTPI	Trust Territory of the Pacific Islands
GAF	geographic areas file	UA	urbanized area
GBF/DIME	Geographic Base File/Dual Independent Map Encoding	UDA	user-defined area
GEO	Geography Division	USGS	United States Geological Survey
GEO-CAT	Geographic Catalog of Legal and Statistical Entities	USPS	United States Postal Service
GIS	geographic information system	UT	unorganized territory
GRF	geographic reference file	WF	workplace file

# CHAPTER 3.

## Census Geography

### INTRODUCTION

Geography is a basic element of the decennial census. It is essential—indeed, critical—for collecting the information, for organizing, tabulating, and presenting the data, and for preparing the maps needed to collect the data and to display the geographic entities shown in the published reports and on the data tapes available to the public. Many Federal agencies, State and local governments, and private firms and individuals use decennial census information tabulated for a variety of geographic entities for analytical and decisionmaking purposes, such as reapportionment and redistricting of congressional and legislative districts, administration of programs, and the allocation of financial resources. Geographic support played a crucial role in every stage of the planning of the 1990 census and in the collection, tabulation, and dissemination of data from the census. This included the following:

- The ability to produce a variety of published and unpublished maps to display the various census entities, including the provision of maps for a variety of precensus, census, and postcensus office and field operations (see chs. 4, “Addresses and Questionnaire Printing,” and 6, “Field Enumeration”).
- Development of computer files that would link residential and workplace addresses to their appropriate geographic entities, provide the Bureau with a geographic basis for processing and tabulating the data, and record and interrelate the various geographic entities for which the 1990 census presented data.
- Participating in meetings, undertaking surveys, and implementing projects to identify the legal and statistical entities that the Bureau would use for reporting data in the 1990 census data tabulations, determine the names and boundaries of these entities, assign a unique code to each entity, and accurately enter this information into a geographic data base.

The Bureau also used census geography to help identify the method of enumeration for a given area, as the basis for administrative control in taking the census, as the structure for data-collection and data-processing activities, and to provide a bridge for converting the information from the enumeration operations into the tabulation entities.

Ultimately, the quality of census data depended not only on the methods of collection and tabulation, but on how accurately the Bureau linked the information it had collected to appropriate geographic entities. A modern census of population and housing must be able to link residential

addresses, map features, and geographic entities accurately to one another, but not until the 1990 census was the Bureau—or anyone else—able to do this with a single seamless, integrated computer file covering the entire United States and its outlying areas. The geographic history of the 1990 census is primarily the story of the development and preparation of the Topologically Integrated Geographic Encoding and Referencing (TIGER) System.

This chapter reviews the geographic concepts, tools, and operations for the 1990 census, with specific emphasis on the role of geography in that census, the maintenance and update of the geographic entities used by the Census Bureau, the development and implementation of the Bureau’s TIGER System, and the maps and files prepared for the collection and tabulation of the census. (The geographic products and services available to data users for the 1990 census are discussed in chapter 10, “Data Products and Dissemination.”)

### GEOGRAPHIC ENTITIES

#### Types of Entities

Geographic entities provide the framework for the collection, tabulation, and presentation of census data. The 1990 census provided data for numerous legal/administrative entities and statistical entities, ranging in size from the United States and its States and outlying areas, to areas as small as individual city blocks. The boundary, name, origin, and legal description (e.g., county, city, town, township) of each **legal entity** result from charters, laws, treaties, resolutions, or other governmental action. Many legally defined entities function as governmental units (GU’s); that is, they are general-purpose governments that have the legal capacity to have their own officials (usually elected) and may raise revenues, provide services, and so forth. A few GU’s choose not to use their governmental powers, but are included in the census data tabulations despite their inactive status. Many other legal entities, although having legally or officially defined boundaries, generally do not have the aforementioned capabilities; entities such as voting districts, election precincts, assessment districts, and ZIP Codes exist as the geographic basis for administering a specific function. A **statistical entity**, on the other hand, is a geographic unit delineated on the basis of standards, criteria, or guidelines issued by the Census Bureau or another government agency specifically for the purpose of presenting data. Some statistical entities serve as the equivalents of legal entities for purposes of data

presentation and analysis. For example, census county divisions take the place of minor civil divisions in certain States; census designated places define clusters of population that have not undertaken the legal formalities of establishing themselves as separate incorporated places.

Table 1 lists the various types of entities for which the Census Bureau provided 1990 census data and the number of such entities. For all these entities, the Bureau had to obtain and maintain information, establish controls in its computer files, and provide data and maps as part of its work for the 1990 census. The following text briefly explains these entities and the efforts the Bureau had to expend on them for the 1990 census; appendix 3A provides specific definitions and more detailed explanations than the text. The reader can find additional information about the nature, derivation, and history of these entities in the Bureau's 1994 publication, *Geographic Areas Reference Manual*. (The *Manual* is also available in electronic form from the National Technical Information Service, Springfield, VA 22161.)

**Geographic areas conferences**—In preparation for the 1990 census, the Census Bureau held one national and three regional conferences to receive recommendations from a broad spectrum of census data users on the selection, definitions, and delineation of geographic entities. In April 1984, the Bureau sponsored a National Geographic Areas Conference in Reston, VA, to discuss geographic issues for the 1990 census with a select group of knowledgeable people known to be intense users of census data. The conference had three major objectives: (1) to identify specific issues concerning the acceptability and usefulness of the geographic entities that the Bureau planned to use (or should use) for presenting the decennial census data; (2) to gather recommendations on improvements needed in the definition, delineation, and presentation of these entities, especially the statistical ones; and (3) to evaluate and determine the most feasible methods for implementing these recommendations in the 1990 census planning process. To obtain recommendations from a wider range of data users at the regional and local levels, the Bureau held three regional conferences—in Oakland, CA; Houston, TX; and Washington, DC—during the fall of 1984. The major objectives were (1) to review the recommendations on the issues identified as priorities during the national conference, (2) to solicit additional comments on these issues, and (3) to identify other geography-related issues and problems that the Census Bureau should address in its planning for the 1990 census.

The Bureau held 75 regional and local public meetings in 1984 and 1985 to obtain local recommendations regarding the 1990 census. It convened at least one meeting in each State, the District of Columbia, Puerto Rico, and the Virgin Islands of the United States. Each day-long meeting covered a variety of 1990 census-related subjects, including census geography. Bureau staff also met informally with appropriate officials in each of the Pacific territories to discuss similar matters. In 1983, the Bureau held a national

meeting with State officials and other interested individuals to discuss their needs for detailed geographic data that would enable them to meet the court-mandated one-person/one-vote requirements for their postcensus redrawing of congressional and State legislative districts. In 1985 and 1986, the Bureau sponsored 12 regional meetings with representatives of the American Indian and Alaska Native communities to solicit their views regarding its 1990 census plans.

## Legal Entities

States, American Indian reservations, counties, incorporated places, and minor civil divisions (MCD's) are the primary legally defined geographic components of the Census Bureau's data presentations. Census enumerations and tabulations have included the United States, States, counties, MCD's, and incorporated places since the first decennial census in 1790. The 50 States and the District of Columbia are the primary legally defined GU's of the United States. In addition, the census treats Puerto Rico, the Virgin Islands of the United States, and several entities in the Pacific Ocean as "State equivalents" for statistical purposes; it refers to these entities collectively as the **outlying areas**. Other legal or officially defined entities for which the Bureau tabulated 1990 census data are consolidated cities (a GU first recognized as a separate entity for the 1990 census), sub-MCD's (only in Puerto Rico), off-reservation American Indian trust lands, Alaska Native Regional Corporations, congressional districts, voting districts, school districts, and ZIP Codes.

**Boundary Surveys**—For the 1990 census, the Census Bureau recognized the boundaries that were legally in effect on January 1, 1990, to tabulate the results of the decennial census. To obtain information about the legal status, names, current boundaries (including the date of each change since the previous survey), and legal descriptions of counties, minor civil divisions, and incorporated places, the Bureau conducted several boundary and annexation surveys (BAS's) during the decade. For each BAS, the Bureau sent to an appropriate official of each GU one or more map sheets covering its area and a form summarizing the information affecting that GU since January 1, 1980 (the effective date for the boundaries used in the 1980 census), accompanied by instructions on how to review and annotate both the maps and the form. Simultaneous with the BAS mailouts, the Bureau sent listings of the counties, incorporated places, and MCD's as they appeared in the Bureau's records to specific State officials for review and update. Later, the Bureau sent to this "State certifying official" in each State (except Hawaii) a list of all the new information that the individual GU's had provided to it, for verification of the legality of each action that affected the inventory (newly incorporated/organized governmental units, disincorporations/disorganizations, mergers) and the names, legal descriptions, and legal boundary changes (annexations, detachments) of the GU's in that State.

Table 1. Geographic Entities for the 1990 Census

Geographic entity	Type	Number	
		United States	All areas
Nation (the United States) .....	legal	1	1
Regions (of the United States) .....	statistical	4	4
Divisions (of the United States) .....	statistical	9	9
States and statistically equivalent entities <sup>1</sup> .....	legal	51	57
Counties and statistically equivalent entities .....	<sup>2</sup> legal	3,141	3,248
County Subdivisions .....		<sup>3</sup> 35,298	<sup>3</sup> 36,434
Minor civil divisions (MCD's) .....	legal	29,395	30,386
Sub-MCD's (Puerto Rico only) .....	legal	-----	145
Census county divisions (CCD's) .....	statistical	5,581	5,581
Census subareas (CSA's) (Alaska only) .....	statistical	40	40
Unorganized territories (UT's) .....	statistical	282	282
Places .....		23,441	23,794
Incorporated places <sup>4</sup> .....	legal	<sup>5</sup> 19,289	<sup>5</sup> 19,365
Consolidated cities .....	legal	6	6
Census designated places (CDP's) .....	statistical	4,146	4,423
American Indian and Alaska Native Entities .....		<sup>6</sup> 579	<sup>6</sup> 579
American Indian reservations .....	legal	<sup>7</sup> 310	<sup>7</sup> 310
American Indian entities with trust lands .....	legal	<sup>6</sup> 52	<sup>6</sup> 52
Tribal jurisdiction statistical areas (TJSA's) .....	statistical	17	17
Tribal designated statistical areas (TDSA's) .....	statistical	19	19
Alaska Native village statistical areas (ANVSA's) .....	statistical	217	217
Alaska Native Regional Corporations (ANRC's) .....	legal	12	12
Metropolitan areas (MA's) .....		NM	NM
Metropolitan statistical areas (MSA's) .....	statistical	264	268
Consolidated metropolitan statistical areas (CMSA's) .....	statistical	20	21
Primary metropolitan statistical areas (PMSA's) .....	statistical	71	73
Urbanized areas (UA's) .....	statistical	396	405
Election entities .....		NM	NM
Congressional districts (CD's) .....	legal	435	435
Voting districts .....	legal	<sup>8</sup> 147,266	<sup>8</sup> 148,872
Other large-area geographic entities .....		NM	NM
School districts .....	legal	15,196	15,274
Traffic analysis zones (TAZ's) .....	statistical	143,537	143,537
Public-use microdata areas (PUMA's) .....	statistical	<sup>9</sup> 3,880	<sup>9</sup> 3,938
ZIP Codes .....	administrative	<sup>10</sup> 29,469	<sup>10</sup> 29,469
Census tracts and block numbering areas .....		61,258	62,303
Census tracts .....	statistical	49,981	50,710
Block numbering areas (BNA's) .....	statistical	11,277	11,593
Block groups (BG's) .....	statistical	226,399	229,717
Blocks .....	statistical	6,961,148	7,017,427

NM: Sum would not be meaningful.

<sup>1</sup>In addition to the 50 States and the District of Columbia (the United States), the 1990 decennial census includes American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Republic of Palau, Puerto Rico, and the Virgin Islands of the United States.

<sup>2</sup>The 11 "census areas" in Alaska are statistical entities.

<sup>3</sup>Includes 4,490 incorporated places and place parts that are not located within an MCD in a county.

<sup>4</sup>In agreement with the State of Hawaii, the Census Bureau does not recognize the City of Honolulu, which is coextensive with Honolulu County, as an incorporated place for statistical presentation purposes. Instead, the State delineates, and the Census Bureau tabulates data for, CDP's that define the separate communities within Honolulu County.

<sup>5</sup>Includes six remainder-of-place records for the portion of each of the six consolidated cities that is not within another incorporated place.

<sup>6</sup>Includes four trust land entities that are not associated with a reservation.

<sup>7</sup>Includes three entities that represent areas jointly administered by two reservations.

<sup>8</sup>Includes only those eligible entities participating under the provisions of Public Law 94-171.

<sup>9</sup>Includes 1,726 5- and 3-percent, 1,760 1-percent, and 394 0.25-percent sample PUMA's in the United States; 29 5-percent and 27 1-percent sample PUMA's in Puerto Rico; and 1 10-percent sample PUMA each in Guam and the Virgin Islands.

<sup>10</sup>The number of ZIP Codes represents the residential ZIP Codes for which the Census Bureau tabulated data.

The Bureau recorded the new information in its computerized boundary-change files and a special file that catalogued information about geographic entities (referred to as the Geographic Catalog of Legal and Statistical Entities, or GEO-CAT file). It also used the information to update its computerized geographic data base—the TIGER data base, also referred to as the TIGER file, which is discussed later

in this chapter. The mailouts were carried out by the Bureau's Data Preparation Division (DPD) in Jeffersonville, IN, under the direction of the Geography Division (GEO). Staff in the DPD and the Bureau's 12 regional sites entered the updated information into the TIGER data base.

The survey universe and materials included in each mailout varied depending on the needs of the Census



Bureau in fulfilling the requirements of its censuses and surveys. The GEO conducted surveys in 1982 and 1987 of all governmentally functioning counties and statistically equivalent entities, and those incorporated places with a population of 2,500 or more, in order to provide January 1 boundary information for the entities included in the data tabulations from the economic censuses taken for those years. In 1981, 1983, 1984, 1985, and 1986, the GEO limited the BAS to all governmentally functioning counties/county equivalents and to those incorporated places with a population of 5,000 or more, in order to capture boundary-change information that would reduce the workload when it implemented the BAS's for the economic censuses and the full survey universe in 1988. The Bureau also used the information from these surveys to help maintain the accuracy of its population estimates program.

In 1988 and 1990, in preparation for the 1990 census, the GEO expanded the BAS to cover all governmentally functioning counties and equivalent entities, MCD's, incorporated places, and consolidated cities—approximately 39,000 GU's in the United States. These two BAS's for the first time (1) included direct contact with officials of MCD's—previously, the Bureau had relied on the counties to provide information about their MCD's—and (2) provided the GU's with computer-generated maps. The primary advantage of these maps was that they were uniform in appearance and content, they displayed the boundaries exactly as the Bureau had recorded them in its data base, and they showed those boundaries in relation to the other features (roads, streams, etc.) in the data base. In addition, where appropriate to do so, the maps showed a fringe area adjacent to those GU's that were likely to annex territory. The maps generated by computer for the 1988 BAS displayed (1) the January 1, 1980, legal boundaries—the boundaries used for the 1980 census—and (2) the most recent boundary (where it was different) reported to the Bureau, which DPD staff had added manually in color. For the 1990 BAS, all the boundaries displayed on the maps came from the computer file. Although the Bureau had planned to have a BAS in 1989, it canceled that survey due to the massive catch-up work required to process the 1988 BAS, as well as a lack of funds and staff time available to carry out another full survey. Staff in the Bureau's 13 regional census centers attempted to obtain the required information from entities that did not respond or had responded incompletely or unclearly to the 1988 and 1990 surveys. The Bureau acquired information for the GU's in the outlying areas via a special non-BAS mailout tailored to each entity, supplemented in some instances with face-to-face discussions with local officials in order to better understand the nature of their legal entities. The overall BAS response rate exceeded 90 percent, but it varied by the type of entity, with counties having a 91-percent response rate; incorporated places, 94 percent; and MCD's, 85 percent.

In a separate operation that was not part of the BAS, the Bureau obtained name and boundary information for federally recognized American Indian reservations and the

boundaries of off-reservation trust lands associated with Federal reservations and tribes from the Bureau of Indian Affairs (BIA), U.S. Department of the Interior. For State-recognized reservations, it obtained the name and boundary information from appropriate State agencies. The Census Bureau provided maps to appropriate tribal governments for review, but each one had to resolve any boundary problems with the BIA or the State, as appropriate, because the Federal Office of Management and Budget (OMB) had designated these agencies as the official coordinating source of the boundaries to be used for the 1990 census of these entities. Information for other legal entities came from a variety of sources; for instance, the States were the source of boundary information for two entities important to many data users: congressional districts and voting districts. The boundary-acquisition programs for non-BAS entities are discussed in the specific sections below.

The Bureau documented the summary effect of all legal actions reported in the BAS for the decade as "Geographic Change Notes," one of the "User Notes" published in the 1990 CPH-2 report for each State; for example, "Podunk village annexed from Smith township." The change notes are designed to make data users aware that population and housing differences for a geographic entity from one census to the next may be the result of boundary revisions rather than (or as well as) internal growth or decline. The notes also identify name changes and selected revisions the Bureau made for statistical county subdivisions and census designated places. The GEO-CAT file, in combination with the TIGER data base, enabled the Bureau, for the first time, to automate much of the process of assembling the change notes. However, the change notes do not identify each individual legal action; listings of all boundary-change activities reported during the decade are available in a computer extract of the BAS file that the public may purchase from the Bureau.

### Statistical Entities

The statistical entities for which the 1990 census provided data included regions and divisions, metropolitan areas, urbanized areas, tribal jurisdiction statistical areas, tribal designated statistical areas, Alaska Native village statistical areas, the county-equivalent entities in Alaska (called "census areas"), several types of county subdivisions, census designated places, the small-area subhierarchy of census tracts or block numbering areas/block groups/blocks, traffic analysis zones, and public-use microdata areas. The identification and maintenance of the statistical entities, the preparation of the criteria or guidelines for establishing and delineating them—except the metropolitan areas, which are designated by the OMB—and the accurate and complete insertion of information about these entities into appropriate files constituted a significant part of the Bureau's geographic effort for the 1990 census.

**Census statistical areas committees**—At the request of the Bureau, local officials organized census statistical areas committees (CSAC's) to carry out much of the

statistical-area delineation work for most metropolitan areas and a number of nonmetropolitan counties. Many areas have had CSAC's for many decades, but the Bureau officially reestablishes them prior to each decennial census. The CSAC's played an important role in assisting the Bureau for the 1990 census by identifying and delineating selected statistical entities. Following Bureau guidelines written specifically for the 1990 census, and occasionally with technical assistance from geographic staff in the Bureau's 12 regional sites, the CSAC's drew boundaries for census tracts in areas new to the census tract program and reviewed the census tract plans in areas that already had them. Many CSAC's also participated in the delineation of block groups and identified and delineated potential census designated places. The CSAC's used local and 1980 census maps for their work on census tracts and block groups, but the Bureau was able to provide computer-generated base maps for their use in the delineation of census designated places (CDP's).

### Geographic Presentations for the 1990 Census

**The geographic hierarchy**—The Census Bureau presents decennial census data for geographic entities in three formats:

1. Inventory presentations, in which all entities of the same type are shown in alphabetic or numeric code sequence, without regard to any hierarchical structure. Examples include an alphabetic listing of the States or the places within a State, or a numeric listing of all census tracts within a county.
2. Summary presentations, in which totals are shown for all geographic entities of a certain type. Examples include data summaries for all places of a certain population size, or for all urbanized areas—whole and partial—within a State.
3. Hierarchical presentations, in which geographic components are presented in a superior/subordinate structure. Examples are the basic census presentations of State/county/county subdivision/place or place part, and census tract or block numbering area/block group/block.

The Census Bureau's hierarchical structure reflects the legal and/or areal relationships between geographic entities. Figure 1 displays the basic hierarchical structure that the Bureau established for the presentation of 1990 census data; this structure was similar to that used for the 1980 census, except that the 1990 census also used enumeration districts (discussed below) in some of its data presentations. Note that the hierarchy portrays places as subordinate to States, because places are not always legally subordinate to counties and MCD's; in its presentation structure for county data, the Bureau uses "place parts" to reflect situations in which a place is located in more than one county or other geographic entity. See appendix 3A for additional explanation of the geographic hierarchy.

**Geographic codes**—The Census Bureau uses codes to represent many geographic entities in order to facilitate working with the records and data for these entities and for presenting information for them in data tapes, electronic media, and other computer files. Coding schemes generally require that all entities within a category have the same-length code, regardless of the length of the entity's name. For example, all States and the District of Columbia have a two-digit code, in alphabetical order, followed by a set of two-digit codes for the outlying areas. The Bureau used the geographic codes published as Federal standards by the National Institute of Standards and Technology, U.S. Department of Commerce. For the 1990 census, it also assigned and maintained its own set of codes for numerous geographic entities and provided and maintained codes that were part of several of the Federal standards. See the glossary (app. 3A) for a detailed discussion of geographic codes and each major geographic entity in the glossary for a description of its coding scheme.

### 1990 Census Updates of the Basic Geographic Entities

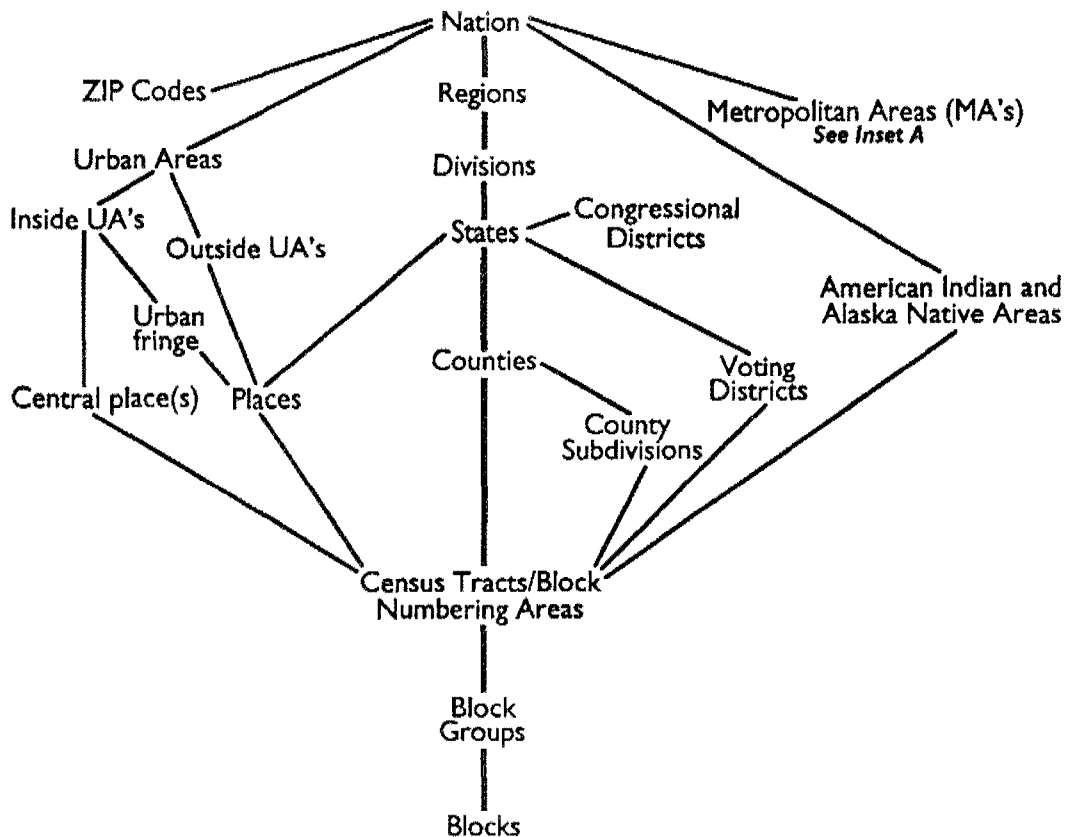
In its preparations for the 1990 census, the Bureau revised its records for States, counties, county subdivisions, places, and statistically equivalent entities to reflect changes provided by or agreed upon with State and local officials.

**States and statistically equivalent entities**—The Bureau had to revise its State-level records for the 1990 census to reflect one major change at this geographic level: on November 3, 1986, a presidential proclamation dissolved part of the trusteeship agreement that gave the United States jurisdiction over the Trust Territory of the Pacific Islands (TTPI). As a result, the Northern Mariana Islands, which had been part of the TTPI, attained Commonwealth status, and the Bureau proceeded to recognize it as a State-equivalent entity for the 1990 census. Also, the Federated States of Micronesia and the Marshall Islands became freely associated States, independent of the United States except for U.S. responsibility for their security and defense; therefore, since they were no longer under U.S. jurisdiction, the 1990 census did not include these two entities. Palau remained as the only area comprising the TTPI, and the Bureau treated it, rather than the TTPI, as a State equivalent for statistical purposes. (Palau became a freely associated State in 1994.) With all of its component entities accounted for elsewhere, the TTPI does not appear in the 1990 census.

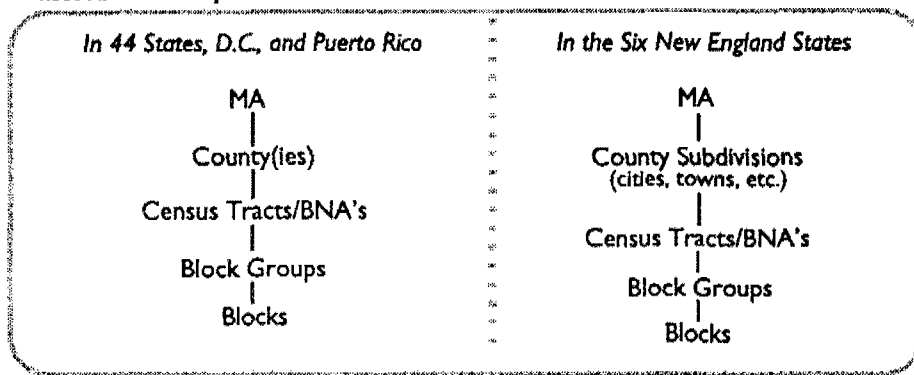
**Counties and Statistically Equivalent Entities**—Other than minor boundary revisions reported in the BAS, the Bureau had to make only a few significant changes to its county-level records, to reflect the following situations:

- In Alaska, changes to the county-equivalent structure resulted from the establishment of four new boroughs during the 1980's. This eliminated one census area and altered the boundaries of several others.

Figure 1. Geographic Hierarchy for the 1990 Decennial Census



**Inset A: MA Components**



- In the rest of the United States, only two new counties were established during the 1980's: one each in Arizona (La Paz, formed from part of Yuma County) and New Mexico (Cibola, formed from part of Valencia County).
- For the Northern Mariana Islands and Palau, with the reclassification of these former county equivalents (within the TTPI) to State-equivalent status, the Bureau reclassified as county equivalents the entities it had previously recognized as MCD's in both areas. The Palau constitution of 1981 changed the legal description of these entities from "municipality" to "state," but despite the use of that term, the Bureau treated them as county equivalents.

**County subdivisions**—For all counties and statistically equivalent entities, the Bureau recognized two major types of county subdivisions: **minor civil divisions** (MCD's) and **census county divisions** (CCD's). A State has either MCD's or CCD's; it cannot have both. Additionally, the Bureau delineated **unorganized territories** (UT's) in parts of nine MCD States and recognized statistical entities called **census subareas** in Alaska. In addition to the typical revisions to the inventory and boundaries of MCD's reported in response to the BAS's, the Bureau revised its records to reflect several major changes in MCD's that took place for the 1990 census:

- Alaska's census subareas experienced significant changes as a result of the aforementioned establishment of four new boroughs during the 1980's.
- The police jury wards that the Bureau recognized as MCD's in Louisiana were becoming governmentally meaningless, while their ever-changing boundaries destroyed the comparability of data for them from census to census. Furthermore, the State found that the wards reported to the Bureau for the decennial census by the parish (county-equivalent) governments were not always the same as those recognized by the State, and therefore the wards were not consistently usable by the State for its legislative redistricting work. In 1986, State officials asked, and the Bureau agreed, to replace the 487 wards reported for the 1980 census with new areas, called parish governing authority districts; each parish provided the Bureau with maps showing the boundaries and names of these entities as part of the 1987 BAS. The State reviewed and approved the 627 districts (and 1 unorganized territory) on Bureau-provided maps to facilitate their insertion into the TIGER data base. This procedure was repeated for the 1988 and 1990 BAS's. Both the former wards and the current districts represent governmentally nonfunctioning, administrative entities.
- The State of Nevada agreed to replace its townships, which are administrative entities whose boundaries are both subject to continuous change and difficult to locate in the field, with a set of CCD's. In 1987, the State delineated 67 CCD's to replace the 57 townships reported for the 1980 census. This brought to 21 the number of States with CCD's.
- With the disappearance of **sub-MCD's**—legally defined subdivisions of MCD's—from the geographic structure of the Northern Mariana Islands and Palau, the 1990 census recognized this type of geographic entity only in Puerto Rico (the *subbarrios*). The elevation of the MCD's in the Northern Mariana Islands to the county-equivalent level (see above) caused the Bureau also to elevate the sub-MCD's it had recognized for the 1980 census one step in the geographic hierarchy, to be treated as MCD's for the 1990 census. As a result of Palau's 1981 constitution, only one of its states (county equivalents) has legal subdivisions, and none have sub-MCD's.
- At the request of Commonwealth officials, the Bureau redesignated as "barrios-pueblo" the MCD's in Puerto Rico that it previously had identified as "pueblos." Also, Puerto Rico officials agreed that the 1990 census no longer had to recognize the unique situation of the special "super-MCD" represented by the entity called a *ciudad* in Puerto Rico. For previous censuses, the Bureau had treated the *ciudad* as a special entity that represented a combination of *municipio* (county-equivalent) subdivisions, but because the legal basis for these

entities—there were only two of them—appeared doubtful, and the fact that they represented an aggregation of other entities for which data were readily available, their retention in the data tabulations for the 1990 census became unnecessary.

For the 20 States that had **census county divisions** (CCD's) in the 1980 census, the Bureau discouraged any revisions to the CCD's so that there would be data comparability from census to census. Nevertheless, the geographic support staff in the Bureau's eight regional sites that served CCD States had to revise some CCD's due to changes in the features underlying CCD boundaries and, more significantly, the Bureau's requirement that CCD boundaries coincide with the boundaries of census tracts and block numbering areas (BNA's). The CCD's in some counties experienced significant changes for the 1990 census as a result of the establishment of new census tracts and BNA's.

In the 9 MCD States (Arkansas, Iowa, Kansas, Louisiana, Maine, Minnesota, North Carolina, North Dakota, South Dakota) that contained areas that were not in any legally defined MCD, the Bureau delineated a total of 282 UT's for the 1990 census. This was an increase of nine over the 1980 census, primarily as a result of individual townships surrendering their governmental functions and, in effect, removing themselves from the political map of their counties. The BAS brought information about such changes to the GEO's attention, which then followed up with the appropriate determination of new UT's or how the area could best fit into the existing UT structure of a county.

**Places**—The Census Bureau recognized two types of places for its data presentations: incorporated places, which are established under the laws of each State or statistically equivalent entity; and census designated places, which are intended to identify densely settled concentrations of population that lack their own governments—that is, they are not incorporated as a city, village, or the like—but otherwise resemble incorporated places. The BAS's reported numerous changes to the inventory and boundaries of incorporated places.

**Consolidated cities** are incorporated places that have consolidated their governmental functions with another level of government (a county or MCD), but still continue to serve as separate incorporated places AND contain one or more other incorporated places. For example, the city of Jacksonville, Florida, has consolidated its governmental functions with those of Duval County, but both the county and the city continue to exist as legal entities; within the city's extended area of jurisdiction are four other legally incorporated places that continue to exist under the laws of the State of Florida. The 1980 census reported data only for the portion of Jacksonville that was not within the other four places (each of which was reported separately in the census), but referred to that area as "Jacksonville city"; nowhere did the census report data specifically for the consolidated city itself, nor did a data user have any

indication that the census figures did *not* refer to the true area and population of the city of Jacksonville. The 1990 census corrected this situation by reporting data in selected tables for the four places; the balance of Jacksonville, identified specifically as “Jacksonville city (remainder);” and the entire consolidated city. The 1990 census tabulated data for six consolidated cities.

To provide data for settled communities that are not incorporated as places, as well as to improve its coverage of the urban population of the Nation, the Bureau designated **census designated places** (CDP’s) if the communities attained specific population thresholds (see app. 3A). State, local, and tribal officials participated in the identification and delineation of potential CDP’s for the 1990 census. The Bureau implemented the following changes for the 1990 CDP program:

- The geographic staff in the Bureau’s regional offices (RO’s) handled much of the coordination with these officials. For previous censuses, headquarters staff generally had served as the liaison.
- The Bureau reduced the minimum population size to qualify for publication in the 1990 census to 2,500 for CDP’s within an urbanized area (UA; see below) in all States except Hawaii (where any CDP needs only 300 people to qualify); the within-UA threshold had been 5,000 for the 1980 census. The Bureau made this change to provide consistency with its requirement that a place needed only 2,500 people to be considered urban. On American Indian reservations outside UA’s, the Bureau reduced the population minimum from 1,000 for the 1980 census to 250 for 1990. The Bureau did so to meet the needs of tribal officials for data for small unincorporated settlements on reservations.
- The Bureau dropped the concept of “whole-town CDP’s”—CDP’s coextensive with MCD’s in States whose county subdivisions had strong governmental powers—from the 1990 census. For the 1980 census, if such an MCD had at least 95 percent of its population and 80 percent of its territory classified as urban, the Bureau also designated the entire MCD as a CDP. For the 1990 census, the CSAC’s could identify portions of such MCD’s as one or more CDP’s, or the entire area as a CDP—or might not identify it at all as a CDP.
- Because of timing limitations, the Bureau qualified CDP’s for recognition in the data tabulations based on the preliminary population counts tabulated for the Postcensus Local Review Program. (Previous censuses had used the final counts.) This allowed identification of the qualifying set of CDP’s much earlier than would have been possible had the process waited for the final counts to become available, but caused the Bureau to include in the 1990 census a few CDP’s that had less than the required population, and to omit several that would have exceeded the threshold.
- In Puerto Rico, the CDP’s are called “zonas urbanas” and “comunidades” (see app. 3A); in the 1980 and earlier censuses, the comunidades were called “aldeas.”

## Changes to Other Geographic Entities

**Regions and divisions**—Users of census data find it helpful to be able to relate the statistics to geographic entities that represent major sections of the United States. The four census regions and nine divisions for which the Bureau tabulated 1990 census data represent groupings of contiguous States (see map in app. 3B), and therefore provide a large-scale geographic framework for comparative statistical analysis. The only change to these entities since the 1980 census took place in 1984, when the Bureau responded to user requests by changing the name of the North Central Region to the more well-known designation, Midwest.

**American Indian/Alaska Native entities**—The Bureau provided 1990 census data for all American Indian reservations recognized by the Federal and State governments. It also mapped and tabulated data for off-reservation American Indian trust lands—property held in trust by the Federal Government for the use and benefit of tribes or individual tribal members related to a specific reservation or tribe. For the 1990 census, the Bureau implemented the following improvements for American Indian entities:

- Tribal officials were given the chance to review the reservation and trust land boundaries the Bureau planned to use for the 1990 census, an opportunity the Bureau did not offer for the 1980 census (see below).
- The 1990 census tabulated data for the actual area contained within the off-reservation trust lands. For the 1980 census, the Bureau only approximated the area covered by trust lands when it prepared its data tabulations.
- To provide better information for American Indian tribes in Oklahoma, the Bureau replaced the “Historic Areas of Oklahoma (excluding urbanized areas)” used in the 1980 census with **tribal jurisdiction statistical areas** (TJSA’s). Oklahoma tribal officials delineated these entities to encompass the area that included the American Indian population over which the tribes claimed jurisdiction.
- A similar new program enabled Federal- and State-recognized tribes outside Oklahoma that did not have a legally established reservation to identify the area claimed to contain the American Indian population associated with each tribe, such as the territory within which a tribe provided benefits and services to its members. These entities were called **tribal designated statistical areas** (TDSA’s).
- To provide more data for settlements on reservations, the Bureau, as noted above, lowered the population threshold to 250 for a within-reservation CDP to qualify for recognition in the census.

These changes were outgrowths of (1) the aforementioned 12 regional meetings that the Bureau had with

members of the American Indian and Alaska Native community in 1985-86, (2) consultations by Bureau staff throughout the decade with an advisory committee that it had established to provide advice and counsel on American Indian and Alaska Native issues, and (3) a Tribal Liaison Program the Bureau instituted to improve the enumeration of American Indian and Alaska Native populations. Although these were not exclusively geographic programs, they did offer anyone who was interested the opportunity to provide input to the geographic aspects of the census entities related to American Indian/Alaska Native populations.

For **American Indian reservations** and associated **trust lands**, in October 1987, the Census Bureau and the BIA signed a memorandum of understanding that provided the framework for the Tribal Review Program. The Bureau initiated this program in response to recommendations from tribal officials requesting the opportunity to review the maps showing the boundaries of the reservations and trust lands before the Bureau used these boundaries for the 1990 census. This program was very successful in improving the accuracy of the 1990 census coverage of reservations and trust lands. The two-phase program really consisted of three separate processes:

- Before the first phase, the BIA and, for State-recognized reservations, appropriate State agencies provided the Bureau with (1) confirmation that the boundaries used for the 1980 census were accurate and had not changed, or (2) certified maps delineating the reservations and trust lands.
- For the first phase, the Bureau sent copies of the certified maps or the 1980 census maps to tribal officials for review of the boundaries. The tribal officials had to resolve any problems with the BIA or State agencies, as appropriate. If they agreed, these agencies sent certified maps showing the correct boundaries to the Census Bureau, which inserted the information into the TIGER data base.
- For the second phase, in mid-1989, the Bureau produced a set of computer-generated maps derived from the TIGER data base, depicting the boundaries it had recorded for the American Indian reservations and trust lands. The Bureau sent these maps, called Tribal Review Maps, to the tribes for review and one more opportunity for recommending revisions. The Bureau submitted all returned maps that contained boundary changes to the appropriate agencies for review and, if appropriate, certification of revised boundaries, and subsequently inserted all approved changes into the TIGER data base.

For the TJSA's and TDSA's, the Bureau provided maps on which tribal officials could depict the boundaries they believed would delimit meaningful areas for which to obtain census data. Boundaries delineated for TJSA's and TDSA's had to conform to criteria established by the Bureau: they could not overlap with reservations or trust lands, they could not cross State lines, and their boundaries had to

coincide with established census block boundaries. TJSA's could overlap where two groups of tribal officials claimed the same area; this happened in two areas, and the Bureau held each small "joint use area" as if it were a separate TJSA. The Bureau did not permit TDSA's to be established in Oklahoma, where the TJSA's fulfilled a similar function, nor could TDSA's overlap one another.

The Census Bureau also attempted to improve the delineation of geographic entities related to Alaska Native populations. The Bureau of Land Management (BLM), U.S. Department of the Interior, is the Federal agency responsible for information regarding the identification of and boundary delineation for entities related to the Alaska Native Claims Settlement Act of 1972; these included the **Alaska Native Regional Corporations** (ANRC's) and the **Alaska Native villages** (ANV's). Using a BLM source map, the Bureau plotted the ANRC boundaries on a set of the U.S. Geological Surveys (USGS) 1:250,000-scale maps, which it used to improve and correct the depiction of the ANRC boundaries used for the 1980 census before inserting them into the TIGER data base. To verify the accuracy of the ANRC boundaries, the Census Bureau implemented a review process similar to the second phase of the Tribal Review Program.

ANV's do not have officially defined boundaries, and their areas of jurisdiction may include many square miles of unpopulated land used by Alaska Natives for hunting and fishing. In late 1988-early 1989, the Bureau's Seattle Regional Office and the Census Community Awareness Program staff of the Anchorage District Office worked with officials of the nonprofit corporation within each ANRC to delineate areas that would define only the settled portion of each ANV for purposes of data tabulation and presentation. The boundaries had to follow identifiable features or the boundaries of other legal entities; often, the settled area was determined to be coincident with an incorporated place or a CDP. Because the boundaries usually did not identify the entire area under the jurisdiction of an ANV, the Bureau applied the term **Alaska Native village statistical area** (ANVSA) to emphasize that these were statistical entities. Accordingly, the ANVSA's for the 1990 census replaced the ANV's of the 1980 census. Census Bureau staff and the officials they worked with used maps derived from the Bureau's TIGER data base to delineate and validate the boundaries of the ANVSA's.

**Metropolitan areas**—The OMB—not the Census Bureau—establishes and publishes standards for and identifies the component entities of metropolitan areas (MA's): metropolitan statistical areas (MSA's), consolidated MSA's (CMSA's), and primary MSA's (PMSA's) (see app. 3A). The PMSA's, which were component areas of CMSA's, were a new concept, and required special coding to ensure that the Bureau could link them to their CMSA's for purposes of data presentation. The Bureau tabulated 1990 census data for MA's as the OMB had defined these entities at the time of the 1990 census. (The OMB redefined the MA's, based on 1990 census data, on June 30, 1993, and the Bureau



published retabulated data for them.) Inset A to figure 1 displays the basic geographic hierarchy related to MA's.

**Urbanized areas and urban population**—As it has since the 1950 census, the Census Bureau defined an urbanized area (UA) for the 1990 census as a continuously built-up area with a census population of 50,000 or more, consisting of one or more core places (“central places”) and the adjacent densely settled surrounding area (“urban fringe”) that contains other places as well as nonplace territory with a census population density of at least 1,000 people per square mile. Note that the term “central place” replaces “central city,” to recognize that CDP's could serve as the core places of 1990 census UA's and to make it easier to differentiate whether a person is referring to the core entities of UA's (central places) or of MA's (central cities) (see app. 3A).

Before each decennial census, the Bureau reviews the criteria for delineating UA's and extended cities. It publishes the proposed criteria in the *Federal Register* for comment from the public and private sectors. The basic elements of the UA criteria developed from 1950 through 1980 remained largely unchanged for the 1990 census. Nevertheless, the Bureau implemented several changes for the 1990 census:

- As discussed above, the Census Bureau reduced the qualifying population threshold for CDP's in a UA from 5,000 to 2,500.
- Areas that had qualified as UA's for the previous census no longer qualified automatically for UA status in the 1990 census. That is, unless the area that met the UA criteria attained the required minimum 1990 census population threshold of 50,000, an area that had a 1980 UA would not qualify for recognition as a UA for the 1990 census. Thus, even though the 1980 census recognized Danville, IL, and Enid, OK, as UA's, these cities and their adjacent densely settled territory did not have the requisite population in 1990, and therefore the Bureau did not recognize them as 1990 UA's.
- A CDP could serve as the central place of a UA. Previously, the Bureau recognized only incorporated places as central places.
- A new criterion permitted inclusion of an entire place in a UA if its central core had a minimum population density of 1,000 people per square mile, provided that the core contained at least half the places population and was adjacent or very close to other qualifying urban territory. This made the inclusion in a UA of places (other than extended cities) that had a population density of less than 1,000 more consistent with the other criteria. For the 1980 census, a place could qualify for inclusion in a UA if it had a core area containing only 50 housing units.
- The Bureau dropped the concept of whole-town CDP's (see section on CDP's above). Thus, a 1990 UA could include only the portion of an MCD that met the population-density criterion and, unlike 1980, the remaining territory and population would be left outside the UA.

- The area measurement capabilities of the TIGER System facilitated the exclusion of the area of water bodies from the population density calculation for blocks, and improved the ability to exclude nonresidential land uses from the land area of blocks. This resulted in a more accurate measurement of the population density of the aforementioned analysis units.

- Where possible, the Bureau linked the title of a UA more closely to the title of the MA associated with it than was done in 1980. It based the names of UA's on the central cities designated by the OMB on June 30, 1990.

For the 1980 census, the Bureau had to guess well in advance of the census which areas would be potential UA's to ensure that those areas were block-numbered, because it based the delineation on individual blocks or groupings of blocks (these “measurement units”—called “analysis units” for the 1990 census—were not the same as block groups). Even so, it missed a few areas and had to assign a single block number after the census to each enumeration district—large areas that served to identify enumerators' assignments—in the fringe area adjacent to the central place in order to delineate the UA's. The availability of 1990 census blocks in all of the United States and Puerto Rico eliminated both the operation and the problem.

The UA delineation operation for the 1990 census involved an examination of 635 potential UA's, covering all or parts of 1,155 counties. Using the precensus local review version of the 1990 block-numbered maps during late 1989-early 1991, the first step was for the staff of the GEO to identify the area that required examination to determine the location of the boundary that would delimit the territory that met the UA criteria. This involved delineating an “inner line” that identified the extent of the area that had previously qualified, but expanded to take into account changes in legal boundaries, new development that obviously would qualify for inclusion, 1980 UA territory that needed to be reexamined, and nonresidential land uses; for areas not previously UA's, the legal boundary of the central places (adjusted for potential extended cities; see below) basically defined the inner line. Beyond the suburbs that had a good chance of being considered urban, the GEO staff drew an “outer line” that defined the maximum potential extent of the area that it reasonably could expect to qualify for inclusion in the UA. The purpose was to concentrate the UA delineation efforts in the area that was most “at risk” rather than the entire extent of suburbia, exurbia, and beyond. GEO staff digitized and inserted the inner and outer lines into the TIGER data base.

Because of the lengthy, labor-intensive nature of previous UA delineation work, the Bureau undertook a major effort to automate much of the task of examining this area by applying customized UA-delineation software to the TIGER data base. After the 1990 census counts were in the data base, the computer could display the territory that potentially qualified for inclusion in a UA, which permitted



the geographic staff in the Bureau's regional census centers (RCC's)<sup>1</sup> to use this information interactively to establish a preliminary UA boundary. GEO staff reviewed each delineation to assure that the RCC's had applied the criteria correctly and consistently. The automated system facilitated the examination and identification of potential boundary features, aggregation and reaggregation of analysis units, display of nonresidential land uses, and measurement of distances, as well as performing edits for completeness and consistency. As staff refined the location of the boundary, the computer continuously summed the component population figures to determine whether the area met the requisite threshold of 50,000 people. After final delineation of UA's in an area, GEO staff checked whether there needed to be a separation or merger of contiguous UA's, followed by the determination of the central place(s) and title for each UA.

One additional change for the 1990 census affected the other component of the urban/rural definition: non-UA urban places. Based on published criteria, the Bureau since the 1970 census had identified certain territory in an incorporated place as rural in order to facilitate the more meaningful delineation of UA's and more accurate identification of an area's urban and rural territory and population. For the 1990 census, the Bureau for the first time applied the delineation of **extended cities**—incorporated places that contain extensive sparsely settled territory—to “over-bounded” incorporated places outside UA's (see app. 3A for details). Of the 280 extended cities identified for the 1990 census, 152 were outside UA's.

**Census tracts and block numbering areas (BNA's)**—Historically, **census tracts** are the most widely used of the small geographic entities for which the decennial census provides data. For the 1990 census, the Census Bureau opened the census tract program to all counties and statistically equivalent entities with sufficient local interest to form a CSAC, rather than just those in MA's and a few other highly populated counties. As a result, the number of census tracts that the Bureau had to maintain and control in its records grew from 43,691 in 933 counties and statistically equivalent entities in 1980 to 50,690 in 1,148 counties/county equivalents in 1990.

For MA's and parts of MA's that previously did not have census tracts and for counties whose officials were interested in establishing census tracts for the first time, the Bureau asked the CSAC's to develop a plan, following guidelines prepared by the Bureau. In areas that already had census tracts, the Bureau asked them to review the existing plan to identify whether and how they should split

census tracts that had grown substantially in population, to recommend suffixes or new numbers to identify any splits, and to suggest a new boundary alignment where a 1980 census boundary was no longer acceptable, primarily due to deleted and realigned features. As it did for previous censuses, the Bureau recommended that most census tracts contain 2,500 to 8,000 people (1,000 to 3,000 housing units), and that they use boundaries that, insofar as possible, would be easily recognizable to data users. In areas that previously did not have census tracts, it also recommended that the new census tracts encompass territory with a population as homogeneous as possible with respect to its demographic characteristics, economic status, and living conditions; however, most CSAC's did not or could not implement this guideline.

For a few MA counties or, in New England, county subdivisions for which the Bureau was unable to obtain local participation in establishing new census tracts, the RO geographic staff established BNA's instead; thus, for the first time, some MA's are not covered entirely by census tracts. In areas with existing plans, if CSAC's chose not to review their census tracts, the RO geographic staff, usually with the verbal consent of the CSAC's key person, revised the boundaries where the underlying features had changed. The geographic staff of the RO's administered the census tract program rather than the staff of the GEO, which had done so for previous censuses. For publication in the CPH-3 series of 1990 census reports, the GEO staff prepared census tract comparability tables to identify census tracts that had split or merged since the 1980 census, and to identify those that had undergone significant changes in boundaries or numbering. The Population Division used this equivalency information to help it perform its Count Review Program that checked for apparent discrepancies in the 1990 census counts.

Counties and statistically equivalent entities not covered by census tracts needed a framework within which the Bureau could assign numbers to the census blocks. The Bureau established **block numbering areas (BNA's)** to provide such a framework. For previous censuses, the Bureau delineated BNA's only in special areas—usually an incorporated place—where certain Bureau programs required providing data by block and these areas did not have census tracts. BNA's are similar to census tracts, except that they were delineated, not by CSAC's, but by officials of States, outlying areas, and American Indian tribes, with assistance from the RO geographic staff if requested; for the 1980 census, the Bureau delineated all the BNA's. The Bureau also offered to have the RO staff do the delineations, which the governments could review and revise, and several chose this alternative or a mixture of the do-it-yourself/you-do-it-for-us approaches. Where the Bureau could not obtain participation, the RO geographic staff prepared the BNA plan without a local review. The extension of BNA's to all parts of the Nation and outlying areas that did not have census tracts increased the number of BNA's that the Bureau had to record and maintain in its files from 3,423 in 1980 to 11,586 in 1990.

<sup>1</sup>The Bureau established regional census centers (RCC's) in late 1987 to oversee and control the 1990 census field operations for each of the 12 regional offices (RO's). It also established a 13th RCC in San Francisco to serve northern California; it performed the same geographic operations as the other RCC's except that it could not update the TIGER data base or plot maps. The RCC's covered entire States (except New York and California), and therefore did not encompass exactly the same areas served by the RO's. The Bureau reassigned the geographic support staff from the RO's to the RCC's.

Because the counties and statistically equivalent entities that required BNA's tended to be less populated than those having census tracts, BNA's could contain fewer people than census tracts; the requirement was 1,500 to 8,000 people (600 to 3,000 housing units) and considerably smaller in the Pacific outlying areas. However, BNA's often were smaller due to several factors, including the very small population size of many of the counties/county equivalents, the Bureau's enumeration and tabulation requirements, system constraints, and special arrangements reflecting the unique needs of some data users. These factors ensured that all but the smallest counties and statistically equivalent entities usually contained at least 2 BNA's; only about 150 counties/county equivalents, or 7 percent of the counties/county equivalents with BNA's, consisted of but a single BNA.

After it had numbered the census blocks, the Bureau found that some county boundaries were recorded incorrectly in its data base. Any revision in the location of a county boundary—whether to correct an error or to reflect a legal change—caused part(s) of one or more census tracts or BNA's in one county, together with their census blocks, to now be located in the adjacent county. At this point, it was too late to revise the census tract plan, which would have meant assigning new, nonduplicative numbers to the blocks, so the alternative was to accept the added census tracts or BNA's as is, and to assign new numbers to them that fit within the numbering scheme of their new county. The Bureau highlighted the new census tracts or BNA's by adding suffixes in the range .70-.98 to their basic numbers. The Bureau also highlighted the fact that census tracts or BNA's in the losing county were affected by adding the same range of suffixes to their basic numbers. It was not uncommon for such a revision to reflect only a slight shift of a county line to correct a minor error in plotting its location, with the result that some 1990 census tracts and BNA's appear as small slivers of virtually unpopulated territory.

The structure of the data base required the Bureau to create one other unusual set of 1990 census tract/BNA numbers. Because the GEO designed the TIGER data base to include the Great Lakes and all waters within the 3-mile coastal limit, it had to assign a default pseudo-number of 0000 to such waters that were not assigned to any real census tract or BNA in the TIGER data base. This number does not appear in the data tabulations nor on the census maps.

**Block groups (BG's)**—A BG is the primary subdivision of a census tract or BNA. Because it is the lowest-level geographic entity for which the 1990 census would provide sample data, local delineation of BG's could ensure that the 1990 census data would apply to meaningful geographic areas. Therefore, the Census Bureau asked the CSAC's to delineate the BG's in counties and statistically equivalent entities that had census tracts, and many did so. Everywhere else, officials of the States, outlying areas, and

tribal governments were offered the opportunity to delineate the BG's. If no participation was forthcoming, the Bureau's RO geographic staff performed this task at the same time that they delineated the BNA's, and therefore offered to let participating officials revise the BG's at the same time that they reviewed the BNA plan (see above); areas with census tracts but no local BG plan did not have this review opportunity. The Bureau recommended that BG's contain 250-550 housing units, with an optimum size of 400; however, in the Virgin Islands and the Pacific outlying areas, BG's could be substantially smaller. As a result of BG's being identified throughout the Nation and the outlying areas, the number of BG's increased from 156,163 in 1980 to 229,717 in 1990.

**Census blocks**—The census block is the smallest entity for which the Census Bureau collected and presented 1990 census data. A block usually represented the territory surrounded on all sides by visible features (roads, railroad tracks, streams, ridges, power lines, etc.) and invisible boundaries (county lines, corporate limits, MCD boundaries, the short imaginary extension of a street right-of-way to another feature, etc.). A census block could be as small as a city block or as large as a vast rural area where adequate boundaries are far apart. As already noted, one of the most significant developments implemented for the 1990 census was the extension of census block coverage to include the entire United States and the outlying areas. This greatly expanded the number of geographic entities in the data products and thereby improved the opportunities for detailed data analysis because, for the first time, data users could obtain statistics tabulated by census tract/BNA, BG, and census block for any area. For the 1980 census, the census blocks were limited to the maximum estimated extent of pre-identified potential urbanized areas, all incorporated places with a precensus population of 10,000 or more, and all other areas that paid the Bureau to report data at the block level. (The 1980 census did number all other blocks, but these were only for controlling field operations, and the hand-written numbers appeared only on the ED maps used by the enumerators.) The number of blocks for which the Bureau reported data grew from 2,545,416 (this includes block parts, the separate portions of a block that was divided by a higher-level boundary, each of which had its own census counts) in 1980 to 7,017,427 in 1990.

Census blocks are numbered uniquely within each block group. The 1990 census blocks were numbered by computer; for the 1980 census, DPD staff had to assign numbers to the blocks manually. The computer assigned a three-digit number to each polygon in the data base that had a road for at least one boundary. In order to retain comparability with the 1980 census, the computer program attempted to use the same numbers used for polygons in the 1980 census in areas covered by address files for the 1980 census; it could do this only if there had been no significant changes in the underlying boundary features. During this operation, the Bureau found that it had more

qualifying polygons in some large-area BG's than it had numbers available, and so it had to create a computer algorithm that would assign a single number to a group of physical blocks. (In a few areas, the Bureau solved the problem by creating one or more additional BG's, but it usually was not feasible to do this.) The algorithm assigned values to certain features in the data base to identify which ones were most appropriate to hold as block boundaries, with the highest priority given to boundaries identified as "must-hold" for voting district data (see below); in a few instances, the computer had to ignore even these boundaries so it would have enough block numbers for the entire BG. Once defined, these were the census blocks and block numbers that the Bureau used for collecting census data and, therefore were called **collection blocks**. Although later operations that involved field work added roads and streets to the Bureau's maps, insertion of those features into the TIGER data base did not change the original block numbers; thus, where this occurred, a block number that had represented a single polygon subsequently represented more than one polygon.

When the Bureau inserted the boundaries obtained from the BAS and other boundary acquisition programs into the data base, those boundaries overlaid the collection block structure. Because many of these boundaries did not follow visible features, they split the original collection blocks. For each block where this happened, the computer assigned a unique alphabetic suffix to each of the resulting smaller blocks; for example, collection block 206 might be split into four parts: block 206A for the portion in City W, 206B for the portion in Village X, 206C for the portion in the unincorporated portion of township Y, and 206D for the unincorporated portion of township Z. Thus, each suffixed block number represented a specific piece of higher-level geography. These blocks were referred to as **tabulation blocks**, the blocks for which the 1990 census reported data. Most collection blocks did not require splits, in which case the collection block number became the tabulation block number.

After release of the 1990 census data, some local governments reported problems with those counts. Some of these problems resulted from boundary changes that the Bureau had inserted incorrectly or not at all during the insertion of the boundary information into the data base, but many had never been reported or had been reported incorrectly to the Bureau. The Bureau required each local government that questioned the boundaries used for the census to provide a certified map that showed its legal limits as of January 1, 1990, together with related information regarding specific boundary changes or problems. If the Bureau had to further split a tabulation census block to reflect the correct boundaries, the computer assigned a second suffix to the number of each such block; for example, block 206A would be split further into 206AA and 206AB, while block 207, if it had not been split before, was divided into 207-A and 207-B. The Bureau used these

boundaries and block numbers as the basis for performing and recording further splits to determine whether the official 1990 census counts required revision.

After review of the incoming complaints at headquarters and review of the BAS information in the DPD, an operation called Count Question Resolution, headquarters sent those cases that merited review of their counts because of boundary revisions to the RCC's for the actual work. The DPD provided the RCC's with block maps on which clerical staff had manually annotated the new boundary. If the associated address register area (ARA) maps that the enumerators had annotated during the field operations had already been shipped from the RCC's to the DPD, the DPD also sent a copy of those maps to the RCC's. Although the official 1990 census data presentations and the census maps did not reflect these block splits, the TIGER data base stored the corrected boundaries and double-suffixed block numbers.

**Congressional districts (CD's)**—CD's are established by State officials or the courts for the purpose of electing members to the U.S. House of Representatives. At the time that new CD's were established following the 1990 census, appropriate officials from each State provided the Bureau with maps and/or geographically coded files reflecting the location of the CD boundaries. The Bureau entered this information, or that for any subsequent intercensal redistricting, into the TIGER data base so that it could tabulate 1990 census data for the 435 districts of the 101st Congress—the Congress that was in office on January 1, 1990, the effective date for the legal boundaries of all geographic entities tabulated in the 1990 census. (Those districts—and therefore the census data—also applied to the 102nd Congress, which was elected in November 1990, almost 5 months before the Bureau could deliver the 1990 census results to the States.)

Following the reapportionment of the House of Representatives based on the results of the 1990 census, and with the availability of the 1990 census data to the block level, the States or courts redrew the boundaries of most CD's for use in electing members to the 103rd Congress. State officials inserted the new CD number related to each census block on special block equivalency files that they prepared and formatted to the Bureau's specifications. Where a CD boundary split a census block, the State assigned the entire block to one of the CD's; thus, the data represent very close approximations of the totals for each CD. The Bureau resolved any inconsistencies by direct contact with the appropriate State official(s). The States also provided maps showing the boundaries that split census blocks so the Bureau could represent the boundaries correctly in its data base and on the maps it published for the 103rd Congress. The Bureau entered the new information into the TIGER data base by computer matching, thereby providing a geographic structure that enabled the Bureau to tabulate data for the new CD's from the 1990 census records; it also enabled the GEO to generate maps depicting these CD's.

**Voting districts**—"Voting district" is a generic term used by the Census Bureau for wards, precincts, election districts, and other geographic units that a State may designate as areas appropriate for purposes of holding elections. Public Law (P.L.) 94-171 requires that the Bureau make decennial census data available to the States for their use in revising their legislative areas in response to the results of that census. Of course, the States used the same data for redrawing their congressional districts, and local governments used them to redefine their representation areas (city council districts, county supervisors districts, school board districts, etc.). The Bureau provided data to each State by voting district, if the State identified such entities to the Bureau, and for appropriate small areas (GU's, census tracts/BNA's, BG's, blocks) covering the entire State, which State officials could use to assemble the needed data in whatever fashion they wanted.

To enable the Bureau to present data for voting districts, the Census Bureau established a three-phase Redistricting Data Program for the 1990 census. The program was the outgrowth of a national meeting that Bureau staff held in 1983 with State officials and others interested in the process. The first phase, known as the Block Boundary Suggestion Project, began in April 1985. For this phase, the Bureau encouraged a designated liaison from each State to visit the appropriate RO to review the preliminary 1990 census base maps, called feature change maps (FCM's), to identify and add visible features that they wanted to be sure the Census Bureau would include on its maps and designate as census block boundaries for the 1990 census data tabulations; the Bureau referred to these as must-hold boundaries. Thirty-eight States and the District of Columbia participated in phase 1; in addition, Puerto Rico participated in a similar Block Boundary Definition Project. The RO's then sent the annotated maps to the Bureau's field digitizing sites (FDS's), which inserted the added features and flagged the "must-hold" boundaries in the TIGER data base for the 1990 census.

For phase 2, the Bureau in mid-1989 provided two sets of computer-generated maps to a designated official in each State. These maps showed the 1990 census collection block boundaries (including those designated as "must-hold" during phase 1) and the legal GU boundaries the Bureau had in its records as of January 1, 1988. The Bureau asked that each official draw the voting district boundaries and identify the districts with a four-character code on these maps. The Bureau also asked the official to provide a list or file identifying the code and name for each voting district. The Bureau required that the district boundaries coincide with census block boundaries; that is, either a physical feature used as a 1990 census block boundary or the boundary of a legal entity. To meet this "whole-block" criterion, a State might have shown the location of a district boundary that did not coincide with the boundary of a census block or legal entity as if it did coincide with a nearby block boundary. Therefore, the voting districts presented in the 1990 census data products and on the 1990 census maps might not represent exactly the actual

districts in effect at the time of the census; State officials were aware of this and agreed that the data would be acceptable. Indeed, the officials were asked to identify which districts were "real" and which were not; the Bureau recorded this information in the TIGER data base and flagged the true districts in the data products and on the census maps.

In preparation for phase 2, RCC geographic staff conducted mapping workshops in each State, the District of Columbia, and Puerto Rico. All 50 States requested the maps needed to participate in phase 2; some States also asked for a copy of the corresponding geographic extract files, from which they could create their own data base related to voting district information. Under a separate program, the Bureau also provided maps to the District of Columbia and Puerto Rico. Forty-six States, the District of Columbia, and Puerto Rico returned maps showing voting districts for all or part of their area. (Only 23 States had participated in the 1980 version of this program.) Bureau staff inserted this information into the TIGER data base.

For phase 3, the Census Bureau delivered the official P.L. 94-171 products to several officials in each State and the District of Columbia before the legally established deadline of April 1, 1991; Puerto Rico received its materials in July 1991. The products included appropriate population data for each voting district, county, county subdivision, place, census tract or BNA, BG, and census block; Voting District Outline Maps and P.L. 94-171 County Block Maps that displayed voting district boundaries in all participating counties; and 1990 Census Tract/BNA Outline Maps and 1990 County Block Maps for counties in which the State had not submitted voting district boundaries. At a later date, the Bureau also provided each State with County Subdivision Outline Maps. (See ch. 10 for additional information.)

**Other geographic entities**—The Census Bureau provided 1990 census data for several special-purpose geographic entities. After the census, the Bureau worked with the U.S. Department of Education and State education agencies to delineate the boundaries or identify the geographic components for 14,422 **school districts** throughout the Nation. Local transportation agencies identified the geographic components of **traffic analysis zones** (TAZ's) for a special program called the Census Transportation Planning Package. To enable the Bureau to provide special information that data users could manipulate to fulfill their needs, State and local officials combined counties, county subdivisions, places, and groups of census tracts to form **public-use microdata areas** (PUMA's) that had a census population of at least 100,000. The Bureau's **user-defined areas** (UDA's) program, which was not part of the Bureau's regular data tabulation program, generated requests to have the Bureau provide 1990 census data for geographic entities defined specifically by data users. The Bureau inserted the codes and/or boundaries of these

entities into the TIGER data base or, for PUMA's and UDA's, an extract of that file, thereby facilitating the production of census data accurately related to each entity. (See ch. 10 for details.)

The Bureau tabulated data for five-digit ZIP Codes based on a special purchased file, compatible with an extract of the TIGER data base, that assigned a residential ZIP Code to each census block—even though ZIP Codes in reality split many blocks. That is, ZIP Codes are administrative units established by the U.S. Postal Service (USPS) for the distribution of mail, and therefore they generally do not coincide with or respect the boundaries of most legal or statistical entities used by the Census Bureau. Accordingly, they are not appropriate for display on maps or treated as entities with specific boundaries for census purposes. The ZIP Codes in the special file were neither derived from nor inserted into the TIGER data base; the ZIP Code information in the data base is that of the actual mailing addresses obtained by the Bureau in its various census operations, and does not lend itself to tabulation in that form. The data represent reasonable approximations of the ZIP Code coverage—data that the ZIP Code-user community informed the Bureau would be adequate for its purposes.

### Collection Geography to Tabulation Geography

The 1990 census collection geography consisted of the combination of three geographic entities: district office (DO), address register area (ARA), and collection block. The Field Division (FLD) determined the DO's partly on the basis of the type of enumeration in an area—mailout/mailback, update/leave, list/enumerate, or selected combinations.<sup>2</sup> The DO's usually consisted of a county, a group of counties, or a group of census tracts. The GEO recorded in the TIGER data base the information it received from the FLD for 449 DO's in the United States and another 15 in the outlying areas.

Each whole or partial census tract within a TAR area (see footnote 2 and the section on TAR geocoding) served as an ARA. In non-TAR areas, BG's served this purpose,

<sup>2</sup>A mailout/mailback area was one in which the Census Bureau mailed a questionnaire to every address recorded in its Address Control File (ACF) and asked the residents to mail the completed form back to a specified Bureau office. It consisted of every address in tape address register (TAR) areas—areas for which the Bureau had purchased and geographically coded a computer file of residential addresses—and every address in the 1988 prelist areas—areas for which Bureau enumerators had recorded residential addresses and their census block numbers in time to get them into a file that created address labels for questionnaires. Update/leave involved having enumerators visit rural and seasonal-housing areas whose addresses had been prelisted in 1989; because the addresses in update/leave areas were less reliable for recognition by the USPS, the enumerators delivered a questionnaire to each housing unit for the residents (if any) to complete and mail back to a Bureau office, and at the same time updated their address records and ARA maps. These three types of enumeration comprised the mail census. List/enumerate was the 1990 census term for the conventional method of enumeration; the USPS delivered an unaddressed short-form questionnaire to each residence, and an enumerator visited each housing unit to pick up the completed form, to conduct an interview if the residents had not completed or had not received the questionnaire, and to conduct interviews at designated housing units to complete long-form (sample) questionnaires. (See chs. 4 and 6 for details.)

but if the Bureau decided to enumerate a BG by more than one method—a code in the TIGER data base identified the type-of-enumeration area, or TEA, for every census block—the computer assigned a separate ARA to the portion in each TEA. To avoid creating large numbers of ARA's due to BG's being in two different TEA's, the FLD tried to use as many BG boundaries as possible to define the extent of the areas in which enumerators would prelist the residential addresses. Using the information in the TIGER data base, the computer established and numbered the ARA's: 1001-2599 in prelist areas, 2601-3999 in update/leave areas, 4001-5999 in TAR areas, and 6001-9999 in list/enumerate areas. The Bureau had hoped to establish another, separate set of ARA's for some operations that had smaller workloads in later operations, but this turned out to be unworkable.

The collection blocks automatically became tabulation blocks unless they were split, in which case the newly suffixed blocks became the tabulation blocks (see section on blocks above). For each collection block that was split by a GU boundary, the Bureau had to determine which living quarters belonged with each newly suffixed block number. By assigning each living quarters to its correct block number, the Bureau would be able to allocate the responses in the census questionnaire to the correct census geography. For some census blocks that were split in an uncomplicated fashion and had address ranges recorded in the TIGER data base, the computer was able to perform the assignment of addresses to the suffixed block numbers. It also could identify those blocks where such assignment was not necessary because they had no living quarters.

For all other split blocks, the computer produced very-large-scale maps that displayed how each block was split. The Bureau sent these maps to the appropriate field offices for assignment of each address in the original collection block to its correct suffixed tabulation block number. The Bureau accomplished this work in three cycles, with the first taking place in the RCC's before the census. This cycle used the information from the 1988 and earlier BAS's for entities whose boundaries were very stable and for places that tended to annex very infrequently; it also was limited to the areas where the census files already contained addresses. The RCC geographic staff attempted to resolve as many splits as possible in the office, but they did not perform any field checks for this cycle; nor did the Bureau insert the information into the TIGER data base or its Address Control File (ACF) at this time. For cycle 2, the Bureau attempted to resolve the splits not sent out for cycle 1, those not resolved in cycle 1, and those added from the 1990 BAS. The DO's carried out this operation (see ch. 6); enumerators visited the living quarters in the field if the DO staff could not identify their location in relation to the legal boundaries. Later, in a third cycle, the RCC's processed late boundary changes and splits not resolved in cycle 2. The RCC's also entered the information into the TIGER data base and the ACF.



The Bureau was able to relate a Questionnaire ID Number on each census form to the ACF, which contained limited geographic information, to connect each address, and therefore the incoming questionnaire, to the tabulation block number. Using geographic reference files (see below), this provided the link to the combination of all the higher-level geographic entities that the Bureau would associate with the living quarters and population represented by that questionnaire. Thus, the Bureau was able to tabulate the data for all levels of census geography without reference to the collection geography.

## AUTOMATION OF THE GEOGRAPHIC SUPPORT SYSTEM

### Tools and Goals of a Geographic Support System

A geographic system must provide support to census activities in virtually every aspect and stage of the census, from the early planning through address allocations, data collection, and the data-tabulation and -dissemination operations. For a modern decennial census, geographic support requires three basic tools that must come together in an integrated system:

- *Address reference files* that (1) link each living quarters and selected nonresidential buildings and land uses to their correct geographic location and (2) classify that location to reflect the various geographic entities for which a census tabulates and presents data.
- *Geographic reference files* that catalog the geographic entities, reflect their codes and attributes, and identify their relationships to one another.
- *Maps* that display the boundaries and the names and/or codes of the geographic entities, to be used (1) by various government officials and the Bureau's staff to review their content for accuracy and to annotate new information, (2) in the Census Bureau's field operations, and (3) for presentation to the public to complement and clarify the data tabulations.

The improvements to these tools from those used in the 1980 census met several important geography-related goals for the 1990 census:

- Increase the general accuracy of the census in terms of its completeness and the correct assignment of data to geographic entities.
- Maintain geographic consistency between geographically coded address files, geographic reference files, and map products.
- Improve the timeliness of the census by providing a variety of geographic products and support when and where needed in the census-taking and data-tabulation processes.

- Provide a set of geographic entities—those discussed previously in this chapter—that would be generally meaningful and useful to the data-user community.
- Provide a greater variety of maps than previously possible, tailor them to the specific needs of the operation or user, and include on them updates from previous operations.
- Enable the Bureau's decentralized regional sites to reproduce maps as needed for field operations, rather than having to rely on a centralized source.

For the 1980 census, the Census Bureau used three geographic tools to capture, edit, and tabulate census data: computerized address-range reference files (the Geographic Base Files/Dual Independent Map Encoding Files, or GBF/DIME-Files) for the urban cores of most UA's, a computerized geographic reference file (the Master Reference File, or MRF), and paper maps. The primary problem experienced with these geographic products was that the Bureau prepared each in *separate* complex clerical operations. Literally millions of geographic entities and identifiers were *independently* entered manually by thousands of people on a variety of maps and into each of two computer files: the GBF/DIME-Files and the MRF. As a result of the sheer size and complexity of the operations, all materials were subject to inconsistencies resulting from erroneous entries; for example, a block number could relate to different areas in, or be missing entirely from, any of the products. After preparation of the original, already-not-entirely-consistent sets of materials, the updates needed to maintain currency of the files and maps in a very tight time frame often could not be made, and those that were made assured the introduction of more inconsistencies. Although only a very small proportion of the information in the data files was inconsistent, these errors caused significant problems in the Bureau's collection and tabulation operations and the public's use of the data. Furthermore, the labor-intensive process contributed to the late delivery of some geographic products.

At the close of the 1980 census, the Bureau realized that it had to automate and integrate the geographic and cartographic support functions to meet the challenge of the future—not just the 1990 census, but all censuses thereafter. The complex and separate operations used to create the 1980 geographic products were not acceptable for the 1990 census, nor were they logical to repeat with the computer-age technology available in the 1980's. Accordingly, it launched and completed an immense effort to automate its geographic processes so that it could produce all products in a consistent and flexible manner from a single, integrated source.

### Conceptualization, Development, and Implementation of the TIGER System

In 1981, an interdivisional Geographic Operations Task Force documented the specific deficiencies and concluded that the Bureau needed to set itself the task of automating

the full range of cartographic and geographic support processes necessary to serve the data collection, tabulation, and dissemination needs of the 1990 census with a nationwide data base—a *single, integrated geographic system* with a computer-readable (or digital) map as its foundation. Since it did not appear that such a system existed, the Census Bureau contracted in 1982 with SPAD Systems, Ltd. to help determine whether any commercial system could achieve the required objectives. SPAD Systems concluded that the procedures used for the 1980 census were unlikely to be acceptable in the future without extensive modification, but that no commercially available system could perform all the required tasks.

As a result, the Bureau, with the GEO taking the lead, decided that it had to develop its own system, which it called the Topologically Integrated Geographic Encoding and Referencing (TIGER) System. The goal was to have the initial set of cartographic and geographic products from the TIGER data base ready by early 1988, in time for the preparatory field activities for the 1990 census, and to maintain and update it in order to provide other geographic services and products at specified times throughout the 1990 census cycle. The data base is the computer file—the TIGER File—that contains all the geographic information needed for the census. The TIGER System also includes the specifications, procedures, computer programs, related source materials, and so forth, required to create, maintain, and use the data base. Supporting the census further are the various geographic activities undertaken by the Bureau, such as the address-range mapping and boundary surveys that provide input to the TIGER data base, and the map production, reference files, and TIGER/Line® extract files derived from it.

To achieve the goal of a single, integrated computer system, the GEO staff had to perform the following activities:

- Design, develop, test, and implement a computerized data structure that would handle the needed geographic tasks and permit timely and flexible output of the files and maps needed for the 1990 census operations.
  - Identify, procure, install, and learn to use new geographic workstations, computer-driven plotters, and host minicomputers to conduct activities associated with building and using the TIGER data base.
  - Build a computer file, for the entire United States and the outlying areas, containing all streets and roads, including their names and, where they exist, address ranges/ZIP Codes; railroads, hydrographic features, and other non-road physical features, including their names where available; and essential “key geographic locations,” such as named apartment buildings, shopping centers, factories, and office buildings that are important as alternate ways to address mail. The file also would identify these features by latitude/longitude coordinates and special codes. The nonresidential information would be useful for both place-of-work coding (see below) and the economic censuses.
- Determine, enter, and verify the boundaries, names, and codes of all geographic entities used by the Bureau to collect and tabulate census and sample survey data, as well as the boundaries and names of major parks and similar land uses, virtually all military installations, and other significant large-area nonresidential land uses.
  - Deal with a variety of special requirements, such as determining precisely the area, both land and water, of any polygon or group of polygons in the file, assigning a latitude/longitude coordinate value to the approximate center—referred to as an “internal point”—of each polygon or group of polygons, and processing the unusual treatment required for crews-of-vessels geography (discussed below).

The final 1990 census TIGER data base contained a latitude/longitude-coordinate value for each of more than 30 million feature intersections and end points and nearly 145 million feature “shape” points that defined the more than 42 million feature segments that outlined more than 12 million polygons in this “connect-the-dots” seamless map of the United States and the outlying areas.

### Initial Source of the TIGER Data Base

The Census Bureau anticipated that the development of the TIGER System would require many iterations of the data base, starting simply with a base map of features, and ending a dozen versions and several years later with a file that would provide a full-fledged geographic support structure for the 1990 census. Accordingly, taking that first step toward developing a base map, the Bureau identified the initial set of information to make up the TIGER data base primarily from three sources:

- The 1980 GBF/DIME-Files, which covered less than 2 percent of the land area but included streets, street names, address ranges, and geographic-entity codes that covered about 60 percent of the population of the United States. Local officials helped create these files and their 1970 predecessors, the address coding guides (ACG’s). The GBF/DIME-Files contained information about visible features (roads, railroads, hydrography, etc.), feature names, address ranges, and ZIP Codes, but this information was current only as of the last update of the files before the 1980 census. (They did not include even the updates and corrections identified by the census enumerators during the 1980 field work.)
- A cooperative program with the USGS, the Nation’s civilian mapmaking agency, that provided the primary source for mapping most of the rest of the conterminous United States—that is, the Lower 48 States. (Note that the District of Columbia was included entirely within GBF/DIME-File coverage.) The USGS had compiled the features in its digital map files to National Map Accuracy Standards by using aerial photography that was no more than 3 years old at the time a particular map was prepared; thus, the USGS had updated most of its maps



during 1983-1987. This contrasted with the 1980 census, whose maps for areas outside the GBF/DIME-Files often consisted of whatever State and local maps happened to be available—including some that were more than 10, or even 20, years old.

- For Alaska, Hawaii, and the outlying areas, the Bureau would digitize available maps, primarily USGS map sheets that ranged in scale from 1:20,000 for Puerto Rico to 1:250,000 for much of Alaska. The vintage of the maps varied widely.

#### **USGS/Census Bureau Memorandum of Understanding—**

The need for a digital data base to support the integrated system led the Census Bureau to begin discussions with the USGS and eventually to form an Interagency Technical Coordination Task Force and initiate test projects to determine the feasibility of building the required digital data base. The USGS and the Bureau entered into a cooperative agreement, called a memorandum of understanding (MOU), in November 1981. The purpose of the MOU was to establish the task force that would review current and projected mapping requirements of both the USGS and the Bureau, apply state-of-the-art technology to initiate the data base, and identify programs where the coordination of resources, projects, and technical services would be of mutual benefit to each agency. The goal of the MOU was to establish, through the task force and subordinate committees, the means to coordinate the production of new or updated maps and related graphic and digital products needed to support the decennial and economic censuses and the USGS's National Mapping Program. (The latter is that agency's continuing effort to maintain and update its topographic maps.) The Bureau and the USGS implemented the MOU by the appointment of a task force coordinator and three to five task force members from each agency.

The USGS and the Bureau amended the MOU from time to time in order to enhance the TIGER data base and to ensure its timely completion. For example, in May 1988, the agencies agreed to explore the opportunities for application of new computer-driven systems to large-volume production of high-quality maps to support each agency's publication programs. As a result, the Census Bureau agreed to deliver, by August 15, 1988, digital map plot files suitable for production on the USGS's Scitex laser plotter. By the same amendment, USGS and Bureau staffs would provide information by February 1989 that would permit evaluation of the information in the TIGER data base as a source for updating the USGS's public-use products, called Digital Line Graphs (DLG's), and feature position information in the DLG files to display new feature information more accurately in the TIGER data base.

**Initial test project—**The Census Bureau had to ensure the useability for census purposes of a map base obtained from the USGS's computer file. To this end, the USGS and the Census Bureau tested the adequacy of the information

in a digital cartographic file derived by digitizing 1:24,000-scale map sheets, in comparison with such a file derived by computer from the 1:100,000-scale map sheets in the USGS's data base. The USGS raster-scanned two 1:100,000-scale map sheets to create vector files,<sup>3</sup> while GEO clerks, using Intergraph equipment, manually digitized the 1:24,000-scale map sheets comprising the same two map sheets. The GEO then plotted the vector file data in different colors at the 1:24,000-scale, and compared the result to the manually digitized maps. The test proved that data digitally captured from the 1:100,000-scale maps could be used to produce large-scale maps that would be acceptable for use by both enumerators and data users.

**The Florida pilot project—**The next concern was whether the USGS and the Census Bureau could accomplish this digital data-conversion process for the entire conterminous United States. In April 1983, an amendment to the MOU established an interagency pilot project to collect, code, and establish a data base using the 1:100,000-scale digital data for the 48 map sheets covering the State of Florida, and to test the map production capabilities of both agencies. The agencies chose Florida primarily because (1) all the materials needed to proceed with this test were available for that State and (2) the USGS needed to complete digitizing the maps of Florida for another purpose. The project enabled the USGS to develop and test new procedures and software, and to incorporate the Scitex scanning and editing system into its current digital production system, while it enabled the Bureau to develop the necessary software and production procedures to encode and structure data for incorporation into the National Digital Cartographic Data Base. For this project, the USGS collected and processed all the transportation and hydrographic data; the Census Bureau performed the attribute coding and structuring of the road data; and the USGS performed the attribute coding and structuring of the hydrographic and non-road data and the final verification, testing, and storing of the information. The project provided data sets for evaluation and testing by both agencies and, upon its completion in late 1983, showed that the proposed work could be completed effectively and within the required time frame.

#### **Creating the Initial TIGER Data Base**

In December 1983, the USGS and the Census Bureau signed an MOU in which they agreed to share the work needed to complete, by mid-1987, a digital data base

<sup>3</sup>Raster and vector are two ways of storing digital map data. Raster files store images of maps basically as pixels; for example, a road may be 5 to 6 pixels wide and hundreds of pixels long. Raster files cannot store attribute data (such as the address ranges, ZIP Codes, census tract codes, and census block numbers for the left and right sides of a road segment) for map features because a feature is made up of multiple pixels rather than a single line. Vector files, on the other hand, store map data by reference to beginning and ending points (latitude/longitude coordinates) of a feature between two intersections; because the feature is a clearly defined line, vector files can store attribute information for a feature itself as well as for both sides of that feature. Both the TIGER data base and the USGS's DLG files are vector files.

containing transportation and hydrographic features for the conterminous United States, based on approximately 1,823 1:100,000-scale USGS map sheets. (The agencies actually accomplished this goal in May 1987.) Meanwhile, the Bureau manually digitized comparable information for the other entities involved in the 1990 census: Alaska, Hawaii and the Midway Islands, Puerto Rico, the Virgin Islands of the United States, American Samoa, Guam, the Northern Mariana Islands, and Palau—a project it completed in January 1988. (It also did this for the Federated States of Micronesia and the Marshall Islands, for which it had the relevant information in its records from the 1980 census, so that the Bureau could provide maps and geographic files quickly if it were called upon to assist in a future census of these entities.) Figure 2 shows the steps involved in creating the TIGER data base.

To meet the deadline, both agencies established complementary high-volume digital production systems. The USGS used 2 Scitex scanners, 15 Scitex R-280 editing stations, 26 Intergraph Interactive editing/tagging stations, 13 Altek digitizing tables, and 4 Gould 9780 minicomputers, which it dispersed among its four regional mapping centers. The Census Bureau used a Sperry 1100/74 and a Sperry 1100/92 mainframe computer. Connected to these computers were 18 Tektronix 4115 computer graphic terminals—later upgraded to Tektronix 4125 terminals—located at Bureau headquarters, and as many as 109 Tektronix 4115/4125/4135 terminals located in the Bureau's 4 FDS's (in Atlanta, Boston, Dallas, and Denver) and eventually in the post-FDS Geographic Update System (GUS) sites in 12 of the 13 RCC's (the San Francisco RCC was not a GUS site).

In summary, the MOU resulted in the following activities to create the initial TIGER data base:

- The USGS captured, in computer-readable form, the transportation features (roads, railroads, major power lines and pipelines) and hydrography (water features such as lakes, rivers, streams, reservoirs) shown on its 1:100,000-scale maps.
- The USGS assigned feature classification codes to all hydrography, railroads, power lines, and pipelines.
- The USGS provided the Census Bureau with these processed data and the unprocessed (that is, unclassified) road information on computer tape files.
- GEO staff "tagged" each road feature with its appropriate USGS classification code, which identified a feature as "freeway," "primary U.S. highway," "city street," "footpath," "alley," etc.
- The Bureau provided a computer tape of the processed data to the USGS.

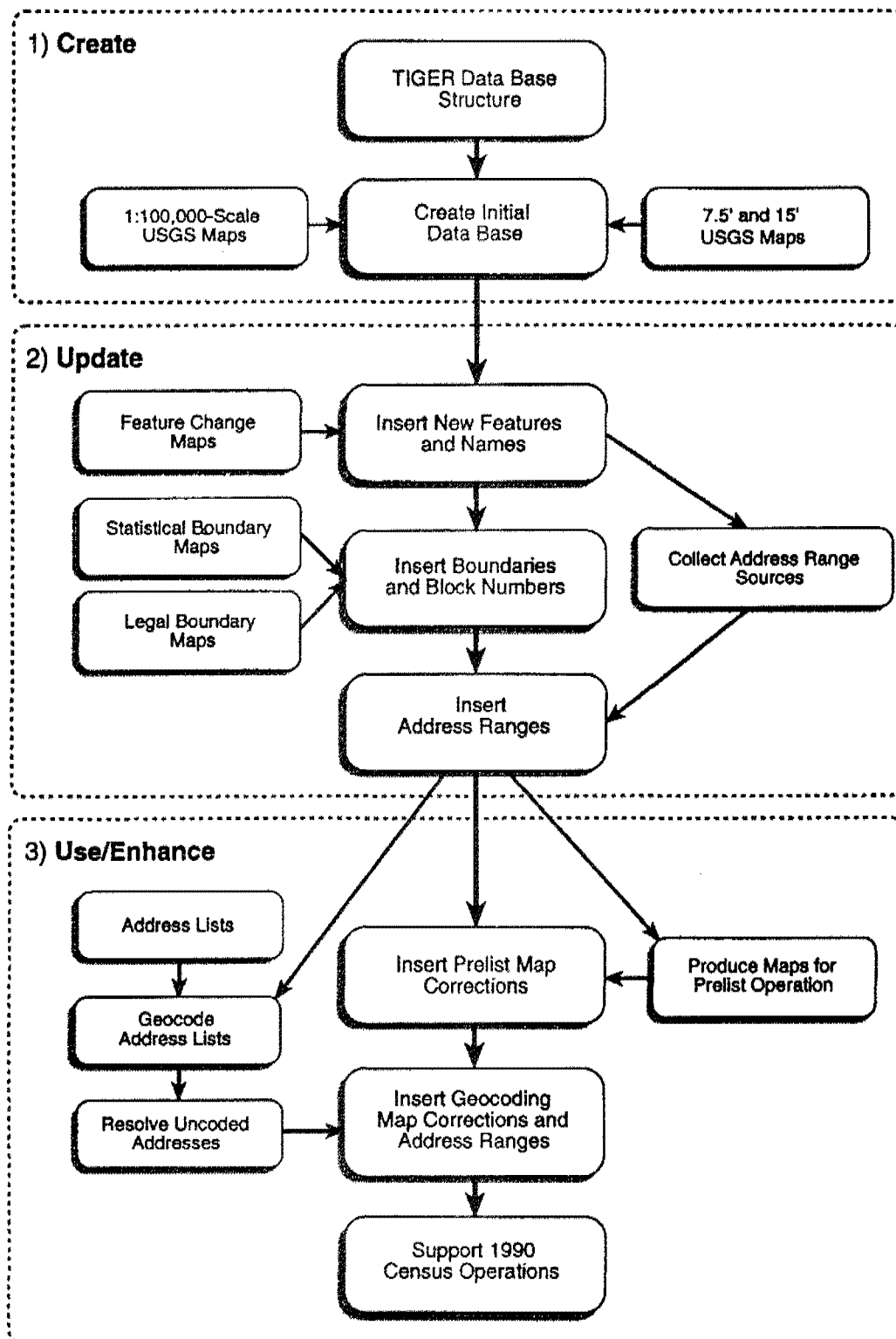
The USGS benefited from this MOU because it accelerated that agency's digital file-building program by completing a 20-year project in 3.5 years, and it enabled the USGS to delegate to the Census Bureau the major task of assigning a classification code to every road and street in the file.

Clerks in the GEO performed the road classification tagging, which they did interactively by using a computer terminal, called a digitizing station, that was connected to the Bureau's mainframe computer. To facilitate the work, GEO staff manually highlighted in different colors each of the USGS's three categories of non-local roads (limited access, major connecting, and minor connecting) on an overlay of each USGS 1:100,000-scale map. The clerks used these maps to identify the roads they needed to tag on the maps displayed on their computer screens; the on-screen maps covered the same area, but showed only roads, all of which initially were displayed in the same color. The clerks used a mouse to highlight each road or road segment they were going to tag, then chose from an on-screen menu the road classification to assign to the highlighted feature. As the clerks tagged each of the three types of roads, the roads on the map changed to an appropriate color for each type. This provided a visual image that allowed the clerks to see the effects of their work and to correct immediately any obvious errors, and enabled reviewers to quickly check the tagged information for accuracy and consistency. The USGS subsequently entered all the processed data for the roads, hydrography, and "other transportation features" into its 1:100,000-scale National Digital Cartographic Data Base from which it created the DLG's.

Following the completion of the editing and tagging operation, the USGS initially processed both data sets through its Unified Cartographic Line Graph Encoding System and then through its DLG Production System software. These systems performed all final data reformatting and verification of DLG files, as well as several logical checks to verify topology—the geometric configurations of features in the data base—and the proper use of attribute codes. The agency responsible for each data set was responsible for correction of inconsistencies, omissions, and errors. After it completed verification of its files, the USGS delivered them to the GEO, which checked the consistency of the transportation and hydrographic data by using software that first horizontally integrated the individual 7.5-minute quadrangle data files, and then merged or "vertically integrated" four layers of data (see figure 3)—roads, railroads, hydrography, and miscellaneous transportation features (power lines and pipelines)—to create a single topological file in a preliminary TIGER data base structure. This involved processing more than 220,000 DLG files, since most of the 1:100,000-scale map sheets consisted of 32 7.5-minute quadrangles and each sheet had 4 DLG layers. The GEO completed the vertical integration in August 1987.

Meanwhile, the geographic support staff in each of the 12 RO's gathered map update source materials from local and State government officials so that the 4 FDS's could insert new or missing roads and streets, together with the names of those streets and all other unnamed map features, into the TIGER data base for areas outside the coverage of the GBF/DIME-Files—98 percent of the Nation's territory, plus the outlying areas. (The staff had to be

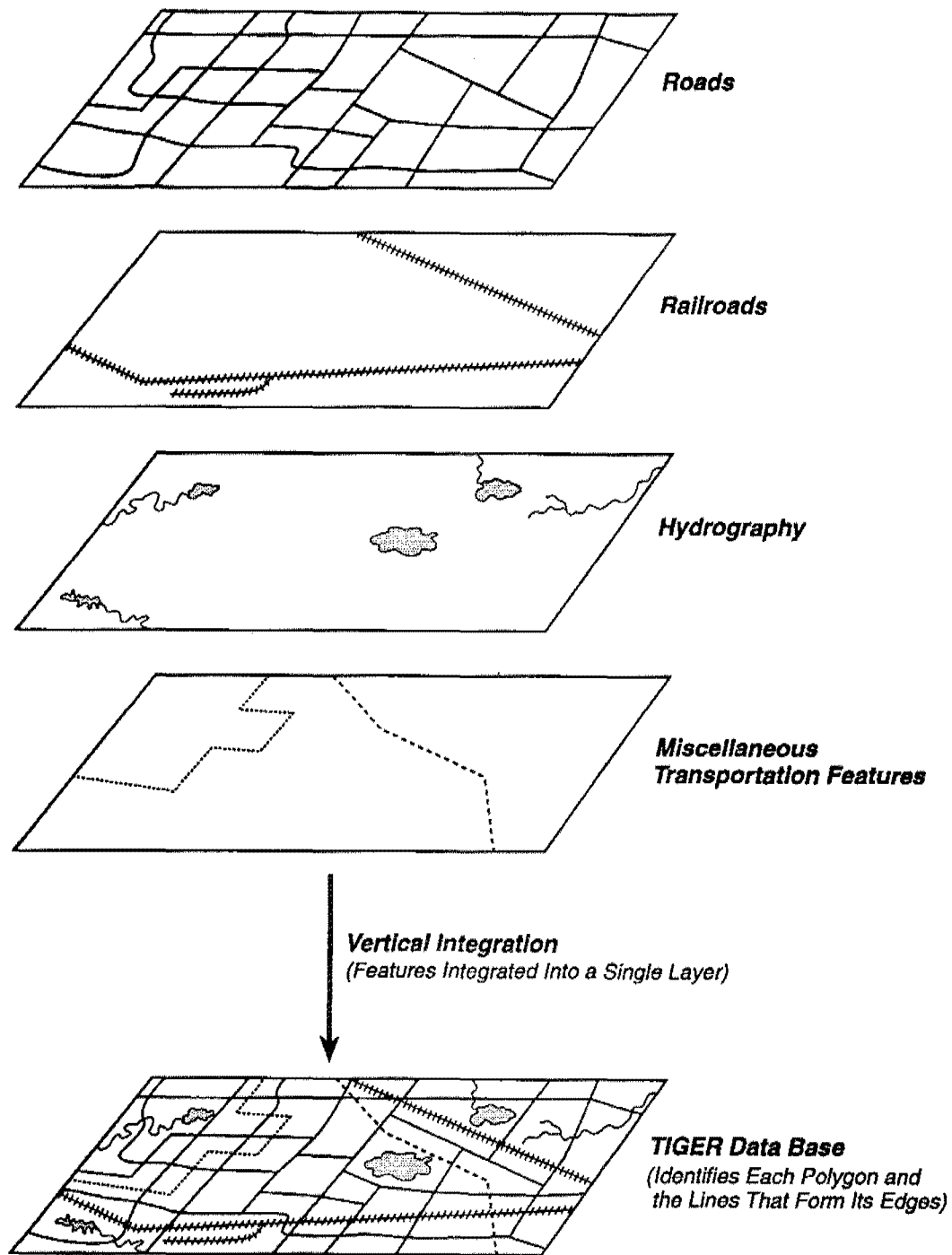
Figure 2. Major Processing Steps for the TIGER Data Base



extremely careful not to add “paper streets” to the file—streets that are shown on an official map, but have never been developed or no longer exist.) They annotated the information on copies of map sheets from the Metropolitan Map Series (MMS) that the Bureau used in UA’s and their vicinities for the 1980 census and on computer-generated

paper copies of the most current version of the USGS 7.5-minute map sheets. These maps were referred to as the feature change maps (FCM’s). The geographic staff also corrected erroneous geographic codes shown on the MMS. The four FDS’s and the DPD were the Bureau’s primary sites for inserting the map feature updates into the

Figure 3. Vertical Integration of Multiple Layers of Geographic Features



TIGER data base from the FCM's. Following a test of the FCM process in the Chicago RO in 1983, the FCM work continued through February 1988; the work had to be completed in time for the Bureau to insert the geographic entities and number the blocks and ARA's in the data base so it could prepare the maps and other materials needed to conduct the 1988 prelist operation. The GEO designed and implemented several quality-control checks in an effort to minimize the incidence of clerical errors during all steps in this process.

The file transfers between the Unisys mainframe computers at headquarters and the microcomputer workstations in remote locations used many combinations of magnetic media and electronic transmission, including floppy disks, computer tapes, and leased telephone lines. The Bureau created individual 7.5-minute (1:24,000-scale) map files from the vertically integrated USGS map files for use on the stand-alone Tektronix microcomputers in the FDS's, and transferred data from the Sperry mainframe computer to 8-inch floppy diskettes for use in the Tektronix

4125 microcomputer graphic workstations. After the FDS's updated the digital files with the features and feature names that the RO geographic staff had annotated on the FCM's, they returned the updated files on 8-inch floppy diskettes to the GEO, which uploaded the files to the Sperry computers for further processing.

**Merging the GBF/DIME-Files**—The Census Bureau had a large investment in the 1980 GBF/DIME-Files, which contained feature names, the potential address range and ZIP Code(s) for each block side of a street, and the 1980 census geographic codes. Furthermore, though obviously incomplete because it was almost 10 years old, much of the massive amount of information in this file was still relevant for the 1990 census. Because the Bureau wanted to retain the information in the GBF/DIME-Files, it developed a system to merge these digital files into the evolving TIGER data base, thereby substituting them for the USGS maps in the core areas of the Nation's UA's. However, before making the substitution, it wanted to update the street and address information in these files. As they did for the rest of the Nation, the geographic support staff in the 12 RO's annotated information on the FCM's from the map update source materials they had collected for the areas covered by the GBF/DIME-Files. For these areas, the staff also collected address information so that they could assign address ranges, where they existed, and their associated ZIP Codes to each side of every segment of the added roads and streets as well as to existing ones that did not already have this information in the files.

The Bureau hired four contractors to insert into the GBF/DIME-Files the updated street and address information that the geographic staff had recorded on the FCM's. The contractors also used the FCM's to correct the 1980 census geographic codes in the files. In addition, the contractors were assigned the task of extending the file coverage by digitizing map features to the edge of each USGS 7.5-minute map sheet that contained GBF/DIME-File features. In some cases, the file was extended only as far as the east-west mid-line of a map sheet, so that the coverage was only for the north or south half of that sheet; in a very few cases, where only a few street segments extended into a map sheet, the coverage was reduced so it would end at the edge of the map sheet. The GEO determined which map edges the contractors should use so it could provide them with the appropriate map sheets. The Bureau referred to the entire area covered by the original GBF/DIME-File, plus (or, in a few instances, minus) the area involved in attaining the map edges, as the "metropolitan area window" (MAW) (see figure 4). Using the USGS map-sheet edges as the boundary of the GBF/DIME-File coverage simplified the task of merging that coverage into the map sheets resident in the TIGER data base.

Because the contractors had no information about address ranges in the extended areas, they maintained the consistency of the files by assigning a surrogate "0-0" address range to both sides of the roads and streets in those areas.

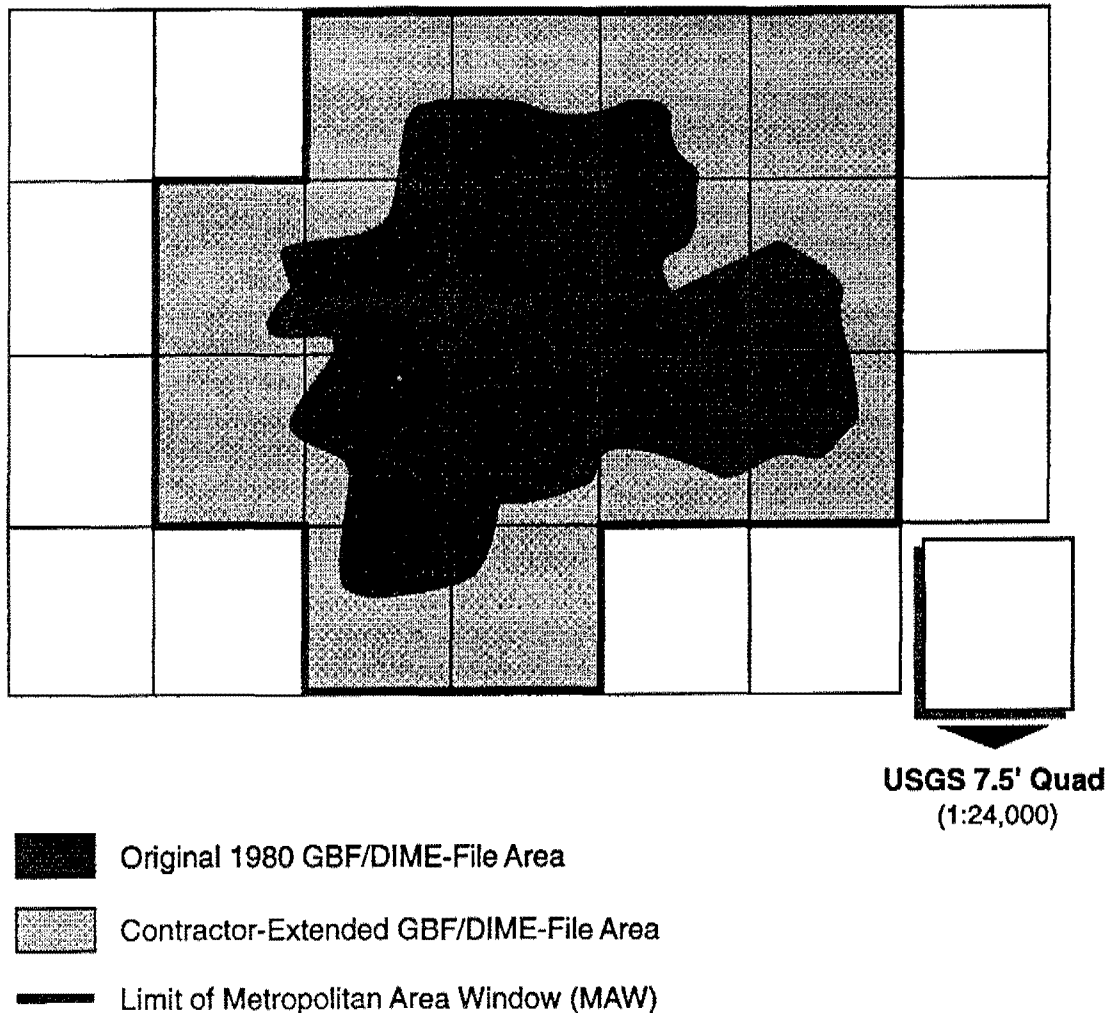
This left the determination of the actual address ranges, if any, to the RO geographic staff. The GEO implemented quality-control checks on the contractors' work, but even so, it had to redo portions of a few of the GBF/DIME-Files that later were discovered to have problems. When the Bureau received the extended GBF/DIME-Files from the contractors, it converted them to the TIGER data base format. A control system attempted to ensure that features matched between all map-sheet edges. The GEO integrated the last of 350 GBF/DIME-Files into the data base in July 1988.

**Problems related to file production**—The project encountered some problems associated with expediting the production of the 1:100,000-scale graphics and numerous technical problems in establishing a smoothly functioning digitizing, editing, and processing routine. Furthermore, ironing out the logistics associated with the transfer of data and materials between two agencies, and even within each agency, caused some complex situations. There were both data problems and problems in quality-control procedures. The data problems were as follows:

- System implementation problems caused by techniques and software development introduced during the initial stages of the project and by the use of different versions of the same equipment.
- Data processing errors, including incorrect keying of input data.
- Interpretation problems, the result of operator misunderstanding of attribute coding standards or map symbology.
- Geometric problems, due to incorrect system digitizing and processing routines that resulted in the automatic generation of extraneous lines and gaps in line segments.

The first three categories were short-term problems that were resolved as staff learned to use the files and as the production process became stable. Resolving the geometric problems required the most effort, requiring procedural changes and the development of new software. Some data sets had to be reprocessed and reverified. The Bureau developed additional computer algorithms to incorporate the extended GBF/DIME-Files into the digital data base. Because the 1980 GBF/DIME-Files had neither the cartographic quality of the DLG files nor the detailed feature attribute information contained in those files, the GEO encountered matching problems that it had to resolve manually. The computer programs also had to ensure that all map features were continuous (horizontally integrated) from one section of the data base to the next; that is, the computer had to "knit together" the related portions of the GBF/DIME-Files and the digital data base derived from the USGS 1:100,000-scale map sheets. The GEO attempted to ensure throughout file development that the features that crossed from one map sheet to another would always be continuous; that is, the GEO put into place a control system

Figure 4. Metropolitan Area Window



that, in an automated process, would not allow features to offset at the map edges, even if this meant slightly distorting their true location on the ground.

### Updating and Enhancing the TIGER Data Base

The initial TIGER data base did not contain the boundaries of any census geographic entities. Because of extremely tight deadlines for completing the data base and to simplify verification, the DPD used an additional 20 Tektronix 4125 microcomputer graphic workstations to digitize the 1980 census geographic-entity boundaries and to enter the related codes for the entities into the evolving TIGER data base, using 1980 census maps as the source of the information; this involved all entities—even BG's, which did not actually have boundaries shown on the maps, and ED's—depicted on the 1980 census maps except blocks. The Chicago and Dallas RO's also participated in this operation. The DPD and the two RO's also assigned key numbers to the boundaries of certain nonresidential land-use areas so that the data base could relate their names to

these features in future map products. The three sites staffed most of the equipment in three 8-hour shift operations per day, so that the Bureau was able to complete the insertion work early in 1988.

The Bureau expected this insertion of "old" (January 1, 1980) information to save time by putting the basic records for thousands of boundaries into the file from a single source, because most State, county, CCD, and census tract boundaries, and the boundaries of many incorporated places and MCD's in some States, would remain essentially the same from 1980 to 1990. In addition, having the 1980 boundaries, names, and codes in the data base provided the information needed to derive information on the comparability of geographic entities between 1980 and 1990. The transfer of the 1980 boundaries from paper maps to computer was not always precise; in fact, due to different representations of the location of visible features, it *could not* always be precise. The annotators had to use their "best guess" when they dealt with legal boundaries that did not coincide with visible features; that is, they had to locate them as realistically as possible relative to the

underlying visible features. Later, the Bureau would ask local officials to correct and update these boundaries when they reviewed the maps plotted from the TIGER data base for the BAS.

When the insertion of the 1980 geography was complete for a county, a computer tape was produced from which the RO's/RCC's could plot county-based maps, called the collection insertion maps (CIM's). Using a variety of maps from State, local government, and commercial sources and the 1980 census, the RO's for several years had been recording information about the boundaries and names of many of the statistical entities to be used for the 1990 census: census tracts, BNA's, BG's, CDP's, CCD's, TJSA's, TDSA's, and ANVSA's. They annotated the 1990 census boundaries and codes for the statistical entities, as well as those for American Indian reservations and trust lands, on the CIM's. The FDS's and the GUS sites, together with the DPD, used the CIM's as the source for inserting the information into the TIGER data base. (The maps could not be block-numbered until the BG's had been delimited in the file, since the BG's provided the framework for assigning numbers to polygons.) The CIM operation began with a test of the operation in April 1987 and continued through March 1989.

The Bureau made a special effort to obtain current maps from the U.S. Army, Navy, Air Force, and Coast Guard, to permit display of the boundaries and names of major military installations, and from Federal and State agencies to provide similar information for significant parklands and similar open-space land uses. Since these were not tabulation entities and did not have their own set of codes, the Bureau had to develop special programs to ensure that, once inserted into the data base, they were recognized correctly in the data base and would be displayed and identified appropriately on census maps.

Another situation that presented the TIGER System with a unique set of problems that required development of special computer algorithms was the need to be able to tabulate the data for shipboard populations and to record in the data base and display on census maps the locations of crews-of-vessels geography (see app. 3A). The Bureau assigns shipboard populations to special crews-of-vessels census tracts/BNA's and blocks in order to allocate that population (which might be many miles away at sea or in a port other than the ships homeport) to the census geography of the ship's homeport or an appropriate docking facility. The locations, based on information that the Bureau obtained from the U.S. Navy, the Coast Guard, and the individual ship owners, do not represent spatial entities, but rather point locations to which the Bureau could code census responses so the data would be attributed to the appropriate geographic entities. And there was an additional problem: no area measurement was relevant for these locations. These unusual entities had to undergo special insertion procedures and other unique treatment to ensure that they would be recorded properly in both the data base and the output from it.

Until late 1988, the TIGER data base was partitioned by the USGS 7.5-minute map sheets originally used to create it. Although the computer could extract from the data base the coverage for any specific geographic entity whose boundaries were recorded in it, such as a county, a data base organized, and therefore directly accessible, entirely by county would be more useful for many of the Bureau's operations. Accordingly, at that time, the GEO replaced the 7.5-minute structure of the data base with one based on counties and county equivalents (for a few areas, such as the independent cities in Virginia, it grouped two or several counties/county equivalents). Thus, the county became the Bureau's convenient partition of the national data base.

Early in 1988, the Bureau dispersed the TIGER data base in 12 separate, nonoverlapping files from headquarters to the GUS sites in 12 RCC's to facilitate their use of the file; in the spring of 1990, it brought it back to a single site in the Bureau's Charlotte Computer Center. For the fiscal years 1988-1990, the 12 RCC's employed staff trained specifically to deal with census geography and maps in order to perform the digitizing work, map production, address allocations, and so forth. At the peak of the operations, it required as many as 2.5 shifts daily to do the work, based on the number of machines available in each RCC. Table 2 lists the number of people and equipment for the geographic operations in each of the 12 RCC's.

**Table 2. Staff and Equipment in the RCC's**

RCC site	Number of map plotters	Number of digitizing stations	Estimated peak geographic staff <sup>1</sup>
<b>Totals</b> .....	<b>37</b>	<b>109</b>	<b>870</b>
Atlanta .....	2	9	56
Boston .....	2	10	60
Charlotte .....	4	11	86
Chicago .....	4	13	93
Dallas .....	2	10	60
Denver .....	5	10	96
Detroit .....	2	7	75
Kansas City .....	5	10	96
Los Angeles .....	2	9	55
New York .....	2	4	45
Philadelphia .....	4	10	86
Seattle .....	3	6	62

<sup>1</sup>The actual number of workers varied because the work was done on a flow basis.

**Enumerator updates**—The 1990 census was the first time that the enumerators' updates to the maps could be included on later versions of the maps. In previous censuses, the only updated maps were those passed on from one enumerator operation to the next, and the updates and corrections from earlier decennial censuses never found their way onto the base maps for the next one. For most field operations, that was still the case for the 1990 census; however, eventually they did find their way into the TIGER data base and onto the final maps and TIGER/Line® products made available to the public. As part of the various census field operations that involved address listing and personal visits by enumerators and other field staff,



the field personnel were instructed to update their ARA maps when the street pattern and/or street names on the ground differed from that shown on their maps. Beginning in September 1989, using copies of the ARA maps from the precavass and prelist operations, staff at the 12 RCC's digitized the map revisions into the TIGER data base. Staff subsequently digitized the updates from the list/enumerate and update/leave operations, and additional updates identified later when enumerators did the block splits and other late field operations. The Bureau completed digitizing all the enumerator updates in November 1991.

## Structure of the TIGER Data Base

The basic structure of the TIGER data base integrates the geometry of a map and the attributes of its associated geographic features into a single, interlocking physical file. The design of the data base adapted the theories of topology, graph theory, and associated fields of mathematics to provide a disciplined, mathematical description of the geographic structure of the entire United States and the outlying areas, which the data base covers without any gaps or overlaps. To facilitate working with the massive amount of information in the data base, as well as for other operational reasons, the GEO divided it into separate files. Although conceptually a single file, the TIGER data base at one time actually consisted of a collection of four types of files: the individual TIGER county partition files, the GEO-CAT, a national partition file, and temporary work files. The Bureau created the latter two files during the various file-building and update activities, and they no longer exist. The county partition files became the predominant files in the TIGER System, both in terms of volume of data and number of files. They contain all the geographic coordinates, codes, and relationships that form the foundation of the TIGER data-base structure. The national partition file served primarily as a reference file that identified the county partition files. The GEO-CAT contained current and historical information about the legal and statistical entities. Created from 1980 census records and updated to reflect current information, the GEO-CAT was the source of the names that go with the codes for the high-level geographic entities, such as States, counties, county subdivisions, and places—but not census tract or BNA/BG/block. It also was the source for information about the relationships among these geographic entities in the county partition files. The GEO-CAT was needed for geographic applications such as controlling a valid list of entities and their codes and for applying names and FIPS codes in mapping operations. It also served as an editing tool when matched against the TIGER data base.

The structure of the TIGER data base can be viewed from two perspectives: the conceptual level and the implementation level. The *conceptual* perspective of the TIGER data base provides a view of the theoretical basis for the data structure and a preliminary understanding of the relationships between the basic elements in the structure. That is, the TIGER data base has a logical structure based

on a mathematical foundation; the geographic entities, their bounding lines, and the intersection points are encoded in the county partition files as representations of real-world geographic phenomena. The TIGER System defines its geographic phenomena in terms of the mathematical theory underlying the structure, which integrates the geometry of maps and the attributes of the associated geographic features into a single, interlocking physical file. At the *implementation* level, the TIGER data base is not a single file at all; rather, it is a series of 32 interlocked subfiles, known as random access logical subfiles (RALS) and directories, connected by intricate linked-list relationships; 27 of the subfiles contain attribute information. The most important system aspects include:

- **Directories**—The nine directories in the structure provide entry into the TIGER data base. Each directory consists of fixed-length records that contain pointers, and some-time descriptive data for the item represented, linking each record in the directory to a random-access record in one other subfile. The directories use a balanced tree (B-tree)<sup>4</sup> structure to store data in sequential order using any alphanumeric key. The GEO designed its own data-base management routines, called the TIGER-I/O, to manage these directories and the random access files.
- **RALS**—The 23 RALS in the structure store and provide access to the information in the data base. The RALS store records randomly, and are accessed by a record number representing a relative position within the subfile. The TIGER-I/O routines retrieve each record in a RALS by its subfile position number. These subfiles consist of fixed-length records that contain pointers and descriptive data for the items they represent.
- **Lists**—The 46 lists in the structure store the explicit relationships between and among the records in the directories and subfiles. Each list has a chain of like elements, all of which have a common "owner." With the TIGER-I/O software, programmers retrieve these list elements as if they were a single entity. The TIGER data base uses five classes of lists: simple list, indexed list, intertwined list, many-to-many list, and multi-lists.

This design proved convenient for the programming staff working in a FORTRAN 77 environment. The Census Bureau used the B-tree structure to create multiple directories within a single file, and added routines to coordinate the directories and RALS and to manage the linked lists. The programmer interface to the data base was a set of FORTRAN 77 routines that could be called by user programs and did not require any preprocessor. The capabilities of the data base included (1) the incorporation of

<sup>4</sup>B-tree is a data structure in a computer file that is a collection of pages containing either an ordered set of data or the pointers to the data. The data or pointers are accessed by using one of the sort keys that determines the order of the data set. The B-tree routines store records ordered by alphabetic or numeric key in B-tree structures and maintain this order during file manipulation. B-trees are commonly used as directories.

separate and discrete subfiles within what the operating system of the computer recognized as a single file and (2) the ability to access the subfiles by user-defined keys or record position, to have many sets of pointers accessing the various subfiles and lists, and to link records between subfiles into a linked-list structure. These capabilities were critical to the overall structure of the TIGER System, and they made the TIGER data base a powerful tool for processing geographic information.

The structure of the data base separates the critical information it contains into "spatial" and "attribute" categories. *Spatial information* refers to the geometry of the seamless map; that is, the size and position of each feature, the latitude/longitude coordinate value of feature intersections and end points, and information that identifies which points are creating a line and which lines are enclosing an area. *Attribute information* includes the labels that name and classify mapped features, the numeric codes that identify the characteristics of lines and points, and the names and codes that identify and distinguish the points, lines, and areas, including the geographic entities for which the Bureau tabulates the data it collects in its censuses and surveys.<sup>5</sup> The TIGER data base stores the information as a network of roads, railroads, hydrography, boundaries, and other mapped features, classified by a system of 0-cells (points), 1-cells (lines), and 2-cells (areas).

The TIGER System identifies all geographic entities and selected spatial features, such as lakes, parks, and military bases, as one or more 2-cells. Linear features, such as roads, rivers, railroads, and boundaries, consist of one or more 1-cells. Coordinate information is stored with the 0-cells. Attribute information about these elements, such as the feature name of a 1-cell or the geographic coverage of a 2-cell, is stored in numerous related subfiles. Pointers between the topological elements and the attribute information act as linkages. The 0-cells, 1-cells, and 2-cells resulted from the vertical integration of the aforementioned four layers of digital data from the USGS (see figure 3) into a single level of data, and from the explicit encoding of the resulting topology.

## AUTOMATED MAPPING FROM THE TIGER DATA BASE

### Basic Concepts

For previous decennial censuses, the Census Bureau used a variety of maps that it obtained primarily from State highway or transportation departments and individual incorporated places, as well as from other governmental agencies and commercial mapmakers. If the available maps

<sup>5</sup>The geographic tabulation unit base (GTUB) subfiles in the TIGER data base provided the geographic cover system needed for the Census Bureau to prepare census data tabulations. Each GTUB record represents a long string of tabulation entity codes, and each record is different in at least one entity code from all other records in that GTUB subfile. There were three GTUB files in the TIGER data base: the 1980 census GTUB's, the 1990 tabulation geography GTUB's, and auxiliary GTUB's for special-tabulation entities.

were unsatisfactory for census purposes, the Bureau compiled its base maps from various sources. For the 1970 and 1980 censuses, it prepared a custom-designed series of street maps, the MMS, that encompassed the urban cores of most UA's. Based on the USGS's 7.5-minute map sheets, except that they usually were centered on the area's largest central business district, the Bureau developed the MMS in conjunction with the ACG's and the GBF/DIME-Files. The maps that the Bureau planned to generate from the TIGER data base for the 1990 census would provide a completely new, unique, and consistent set of maps for all areas covered by the decennial census. However, at the time the system had to be developed, no commercial software could be found that would meet the full scope of the Bureau's map production needs. Therefore, the Bureau directed all its map production efforts to internally developed software. Eventually, this work was accomplished through the direct efforts of a staff of about 100, fewer than 1/10th the number of people needed to prepare all the maps needed for the 1980 census.

From the beginning, the Bureau decided that the structure of the TIGER data base should be an "open design" to allow mapping applications software to create a variety of as-needed cartographic products. Because the design had to allow the data base to serve other functions, such as the creation of geographic reference files and the geographic coding of addresses, the GEO could not structure the data base in a manner that would have been best suited to mapping purposes only. One of the responsibilities for the Bureau's cartographers in the development of the TIGER System was to identify the cartographic content necessary to support all anticipated mapping activities. As one step in this process, the Bureau designed and implemented its own census feature class code (CFCC) scheme to classify the cartographic information it needed for its maps; the Bureau did not require the detailed content of the USGS attribute-coding scheme and its open-ended classification system, which permitted multiple codes to be attached to a single map feature. For example, the USGS used a combination of up to seven different codes to describe each road feature (a code for the number of lanes, a code for the roads historical significance, codes for over- and underpassing, etc.) in its DLG files, and could add more if the need arose. The Bureau's cartographers needed only the attribute codes required to identify and display a specific type of road (interstate highway, secondary highway, other road or street, alley), so where appropriate, they combined the various descriptive attribute codes used by the USGS into a simpler set of CFCC's in the TIGER data base. This cartographic specification led to a computer program that automatically converted the USGS codes to CFCC's for roads, railroads, hydrography, and miscellaneous transportation features. As a separate operation, the GEO created and applied a special set of classification codes to identify the different types of offshore water areas: territorial sea, coastal, inland, and Great Lakes.

To produce the large number of maps that the Bureau would need to support its data-collection activities, the

GEO could not have a system that would require the manual interactive editing of those maps. Therefore, the GEO decided that its maps should come from a totally automated production system that determined the scale of each map or set of maps based on the features to be displayed for a given area. Thus, although all the sheets comprising a certain type of map for an area (except any insets) would be the same scale, the scale for the same type of map could be different for other areas. The software also automatically (1) determined the map sheets needed for each specific area; (2) decided whether to produce inset maps for areas with congested street patterns; (3) placed all feature identifiers (primarily names of roads and streets, railroads, and water features), names and/or codes of geographic entities (including finding the best location to display each census block number within its appropriate polygon(s)), and landmark names and/or symbols; (4) generated margin text, including a map identification number, map sheet index, State and county names and codes, and the appropriate map scales; and (5) produced a bar code that uniquely identified each map sheet. The software also produced, on graphics workstations, all text, line work, and other cartographic components related to the map image.

**The Cartographic Extract**—For mapping efficiency, the Census Bureau developed and implemented a secondary data base from the TIGER data base, referred to as the cartographic extract. Whereas the TIGER data base broke down features into their most basic topological elements, the cartographic extract built up the 0-cells, 1-cells, and 2-cells into complete coordinate chains required for display of complex map symbology, such as the traditional symbol of a solid line with cross-ties that represents a railroad on a map. The chaining of TIGER data elements also supported some cartographic functions, such as the automated placement of names. The cartographic extract had a simple data-base structure with five subfiles, connected by four linked lists. Designed to conserve computer processing time, the cartographic extract assembled and presented TIGER data in a format that facilitated the mapping process. The mapping software could produce numerous maps from the extract without re-extracting and reassembling data from the TIGER data base, thereby minimizing the impact of an already demanding computer-processing environment. The cartographic extract proved particularly useful during the development of new map products and during the testing of new mapping applications. The most significant drawback was that, as a secondary data base, the design of the cartographic extract did not permit direct update, so that each update of the TIGER data base required the creation of a new cartographic extract. Nevertheless, despite its limitations, the cartographic extract improved overall mapping efficiency for the 1990 census.

**Advantages and disadvantages of automating the mapping system**—The conversion to an automated mapping system reduced costs, improved precision, decreased response

time, enhanced flexibility, and expanded the Bureau's ability to handle large data sets, and to do so quickly and consistently—especially when the number of map types and the total number of map sheets exceeded all predictions for the Bureau's mapping plans. In effect, as long as the data exist in the TIGER data base, the system could design, program, and produce any desired map. The system also dramatically improved the overall quality and accuracy of the 1990 census maps. The TIGER System enabled the Bureau to maintain an updated file that could record late revisions to geographic features and boundaries, which could be reflected in later versions of the census maps. This was not easy to do with manual techniques because even one revision could require carefully drafting a consistent set of changes to each of several different artwork bases, usually followed by photographic composition and reproduction of those bases as a single map sheet; this was the procedure used in the DPD for the 1980 census. Finally, by providing plot tapes and equipment to the RCC's, the Bureau could decentralize the production of maps needed for field operations; this enabled the RCC's to be very responsive to the special needs of their DO's, a responsiveness that was beyond the means of the centralized system used for the 1980 census. The disadvantages were the high cost of the initial development of the basic system and the mapping software as well as the cost of acquiring the necessary hardware, the long lead time necessary to put the initial automated system fully into production, high equipment maintenance costs, increased need for staff with specialized skills, and the limitations on cartographic design imposed by software and output devices. Of course, the biggest advantage was that the Bureau would now have an automated system in place and, with the initial costs behind it, could move forward with using the TIGER System as the basic tool for mapping operations needed for the Bureau's future censuses and surveys.

## 1990 Census Maps

**Mapping Teams**—In 1987, the Bureau established three teams to develop the software needed for automated mapping activities. These teams were to design and implement a fully automated map production system that would meet the needs of producing all the various types of map sheets required for 1990 census activities.

- One team was responsible for developing the software to create the CIM's to be used by the geographic staff in the RO's to record the collection geography for insertion into the TIGER data base. The electrostatically plotted CIM's portrayed the cartographic base features and the 1980 census geographic entity boundaries and names recorded in the data base. This was the Bureau's first attempt at plotting maps from a fully topological data-base structure. The CIM's also were the first map product used for digitizing annotated information into the data base by reference to the corner points labeled on the maps.

- The large-scale map team produced, directly from the TIGER data base, several types of very-large-scale maps required for the 1990 census field operations. The map products included, but were not limited to, address register area (ARA) maps that were used by some 300,000 enumerators to canvass their assignments; TAR geocoding resolution maps, used in the RCC's to geocode residential addresses that the data base could not assign to a census block number; block-split maps, used by RCC and DO staff to assign the correct suffixed tabulation block numbers to living quarters in collection blocks that were now split by a boundary as a result of inserting into the TIGER data base (1) the boundaries of legal entities submitted to the Bureau by local and tribal officials and (2) a few statistical-entity boundaries that had to split a large block; and the post-enumeration survey block sketch maps used as a reference for field staff to evaluate the accuracy of the allocation and completeness of the enumeration of living quarters for the 1990 census within specific clusters of blocks (including an adjacent "search area" for finding possibly mis-allocated living quarters). This team also created the small-scale maps provided to State, tribal, and local governmental officials for the BAS's and the Tribal Review Program.
- The small-scale mapping team developed several map products that had diverse requirements, and thereby greatly expanded the utility and efficiency of the cartographic extract. In support of field data-collection activities, one set of small-scale maps required the display of ARA boundaries and codes for each county (the county locator maps) in a district office, and another had the same requirement for the entire district office (the district office wall maps). The postal locator maps showed the geographic extent of the mailout/mailback enumeration area that covered a small urban settlement, called a "prelist pocket," within an otherwise rural county in which the Bureau would be using the traditional door-to-door approach to census-taking; USPS employees used these maps to determine if an address was inside or outside the pocket, thereby avoiding duplication when they added missing addresses to, and corrected addresses already recorded for, the address list for the pocket. This team also produced the county block maps, which were county-based block-numbered maps used for the pre- and postcensus Local Review Programs, phase 2 of the Redistricting Data Program, and other 1990 census-related programs, as well as being the final block-numbered maps, with and without voting districts, sold by the Bureau to the public. The most important aspect of these maps for their users was that, for large areas, the maps displayed the 1990 census block numbers, the location of boundaries and visible features, and the associated geographic identifiers. This team also produced the voting district outline maps (county maps that displayed the voting districts used in the 1990 census), entity-based block maps (block-numbered maps for each place located in more than one county, Alaska Native

area, and American Indian area), and census tract/BNA outline maps (county maps that displayed the 1990 census tracts or BNA's).

**Types of maps**—Three broad categories of mapping products supported 1990 census operations: field maps, data product maps, and special-request maps. Table 3 lists the types of maps extracted from the TIGER data base, together with the number of map sheets produced for the 1990 census. The Bureau plotted **field maps** for use in the collection, review, and insertion of boundaries of geographic entities, for updating the TIGER data base, for making field assignments to enumerators, for field address-list development and update, for data collection, for allocating addresses in the block-split operation, for the pre-census and postcensus local reviews of block-level counts by tribal and local officials, and for the field work needed for the post-enumeration survey (see chs. 4 and 6). **Data product maps** for the 1990 census fell into two categories: summary reference outline maps and statistical (thematic) maps. (Appendix 3B shows examples of basic 1990 census maps; Chapter 10 describes each type of data product map.) Summary reference outline maps displayed the geographic entities—usually with their names and sometimes with their codes—for which the Bureau tabulated 1990 census data; thematic maps used patterns, colors, and/or symbols to present the spatial distribution of selected 1990 census data and related information. The Bureau designed the data product maps, produced as either electrostatically plotted map sheets or as film negatives to be used to make printing plates, to be used with the tabulated data for various geographic entities. The TIGER System also was able to produce a variety of maps from the 1990 census, on a cost-reimbursable basis, in response to special requests from government agencies and other data users.

In October 1987, the RCC's, using the plot tapes provided to them by headquarters, began the production of individual map sheets plotted on electrostatic plotters for the early field operations. This first set of maps from the TIGER data base was produced for use in the 1987 test census, followed by the maps needed in 1988 for the dress rehearsal census. The RCC's plotted the first prelist maps in 1988, for use by field offices and enumerators to compile the 1990 census address list in the early (1988) prelist areas. The supervisor of a crew of enumerators used small-scale maps and street indexes derived from the TIGER data base to prepare and control assignments to ensure complete coverage of his/her assigned area (called a crew leader district), while enumerators used the very-large-scale ARA maps as reference tools to locate and annotate the location of each living quarters in the field (except in TAR areas) and to assign a block number to each living quarters within the ARA.

The first data product maps that came out of the 1990 census TIGER System were electrostatically plotted during late 1990 and the first half of 1991 to accompany the population counts provided to State officials to fulfill the

Table 3. Number of 1990 Decennial Census Map Sheets

<b>Part 1: Electrostatic Plotter Map Sheets</b>	<b>1,434,214E</b>
<b>True Field Maps</b>	<b>615,738E</b>
1988 Prelist ARA Maps	121,571
1989 Prelist ARA Maps	74,249
TAR Geocoding Resolution Maps	62,123
Precanvass ARA Maps	40,850
List/Enumerate ARA Maps	75,165
County Locator Maps	8,266
District Office Wall Maps	4,827
Postal Locator Maps	1,404
PES Block Sketch Maps—TAR/Prelist	4,314
PES Block Sketch Maps—Update/Leave	534
PES Block Sketch Maps—Puerto Rico	1,163
Cycle 1 ARA Block Split Maps	55,100
Cycle 2 ARA Block Split Maps	158,172
Late-Receipt ARA Block Split Maps	8,000E
<b>Boundary and Feature Collection/Verification Maps</b>	<b>277,698E</b>
Feature Change Maps (FCM's)	60,000E
Collection Insertion Maps (CIM's)	74,063
1988 BAS Maps—50 States and D.C.	72,290
1988 BAS-Like Maps—Outlying Areas	2,250
Tribal Review Maps	1,771
1990 BAS Maps	67,324
Counties	24,713
Minor Civil Divisions	18,214
Places	24,397
<b>Early/Limited-Use Data Product Maps</b>	<b>392,525</b>
Place-of-Work/Congressional District Work Maps	39,799
Precensus Local Review Maps—Counties	86,425
Precensus Local Review Maps—Minor Civil Divisions	48,316
Precensus Local Review Maps—Places	50,817
Precensus Local Review Maps—American Indian/Alaska Native Areas	2,467
Postcensus Local Review Maps—Counties	65,746
Postcensus Local Review Maps—Minor Civil Divisions	67,107
Postcensus Local Review Maps—Places	29,163
Postcensus Local Review Maps—American Indian/Alaska Native Areas	2,685
<b>1990 Census Data Products Maps</b>	<b>148,253</b>
P.L. 94-171 County Block Maps	59,780
County Subdivision Outline Maps	101
Voting District Outline Maps	7,819
1990 Census County Block Maps	69,136
Census Tract/Block Numbering Area Outline Maps	5,708
Urbanized Area Boundary Maps	459
Governmental Unit Maps	5,250
<b>Part 2: Printed Map Sheets</b>	<b>7,824</b>
<b>Maps for Published 1990 Census Reports</b>	<b>6,879</b>
State/County Outline Maps	57
State/Metropolitan Area Outline Maps	81
County Subdivision Outline Maps	504
Census Tract/Block Numbering Area Outline Maps	5,708
Urbanized Area Outline Maps	520
The United States of America	1
Census Regions and Divisions of the U.S.	1
Metropolitan Areas of the U.S. (2-page)	1
Urbanized Areas of the U.S. (2-page)	1
American Indian/Alaska Native Areas (2-page)	1
Major Acquisitions and Date of Admission of States	1
Centers of Population of the United States	3
<b>Special-Report Maps</b>	<b>936</b>
Congressional District Atlas—103rd Congress	936
<b>Wall Maps</b>	<b>9</b>
U.S. County Outline Base Map	1
Choropleth Maps, including Night-Time Population Distribution, 1990	4
Congressional Districts of the 103rd Congress	1
Congressional Districts of the 104th Congress	1
Metropolitan Areas of the United States, June 30, 1993	1
Metropolitan Areas of the United States, July 1, 1994	1

E=Estimate

requirements of P.L. 94-171 (see section on voting districts above; see ch. 10 for specific products). The GEO produced these black-and-white maps using batch computer programs with no interactive editing.

A few of the maps published in or to accompany the 1990 census reports were printed in the traditional way—that is, the Bureau provided film negatives to the Government Printing Office to reproduce the maps. However, the vast majority were electrostatically plotted (such as the county block maps and the census tract/BNA outline maps). Most were monochromatic (i.e., black and white), but a few thematic maps were multi-color products. The GEO produced most page-size maps by using a combination of fully automated processes and interactive computer-assisted edits, the latter to ensure that the maps met the Federal Government's high quality standards for publication; cartographers and geographers interactively edited the map files, particularly to improve the placement of names, before release for printing or plotting. The GEO put out the final version of most full-size thematic maps by using traditional mapping procedures, with a contractor performing the photographic and related services.

The Bureau presented all data product maps in one of three standard sizes: page size (approximately 8.5x11 inches), two-page size (approximately 11x17 inches), and "full" size (up to approximately 36x42 inches). Individual map sheets varied in their geographic coverage; that is, the areal extent of the geographic entity being mapped. Most thematic maps and some summary reference outline maps covered the entire United States. When the United States was the mapping unit, the map usually showed Alaska and Hawaii as insets; a few small-scale wall maps also displayed insets of the outlying areas. The scale used for each map depended on the parameters of map size, map coverage, and map content. The thematic maps almost always were small-scale maps that displayed only a limited number of tabulation-area names and boundaries; they generally did not show cartographic base features, with the exception of coastlines and very large bodies of water. Similarly, most of the small-scale summary reference outline maps displayed only a few levels of 1990 census geography. The geographic entities and detailed cartographic base features portrayed on the large- and medium-scale summary reference outline maps varied from one map type to another.

By 1991, the Census Bureau's automated mapping system had generated more than 1.4 million unique map sheets and 7 to 8 million copies of about 30 different types of maps in support of the 1990 census data-collection and data-tabulation operations. The Bureau also had produced almost 150,000 map sheets to support its data products dissemination program.

**Map-related hardware**—As already noted, the RCC's plotted the maps that displayed the entities needed for field operations. They did this by using plot tapes generated by the Bureau's mainframe computers from the TIGER data base. For previous censuses, the DPD used Diazo machines

to reproduce the needed maps in the appropriate numbers, and shipped them to every DO on a flow basis; this centralized system proved to be neither timely nor flexible (for example, it could not respond quickly to a DO's request for an additional map). For the 1990 census, the Bureau used a variety of hardware platforms to develop and implement its automated map-production operations. It designed the original software for the production of field maps as a dynamic batch operation, coded in FORTRAN 77, to run under the Exec 8 System on Univac (later Unisys) 1100-series mainframe computers. The Bureau used 37 Calcomp 5733 series plotters as the plotting hardware in 12 RCC's (see table 2); each RCC also had one automatic map-folding machine. The DPD had similar equipment. The plotters had a resolution of 200 dots per inch, printed only in black and white, used rolls of paper that were 36 inches wide and up to 200 feet long, and were capable of plotting at a maximum speed of about one inch per second—in other words, these were high-speed, low-resolution, monochromatic (black-and-white) electrostatic plotters. By 1988, the Bureau had purchased a number of Digital Equipment Corporation VAX (Virtual Address Extension) 8000-series computers and installed them in 21 sites at headquarters and the 13 RCC's and 7 processing offices, connecting them by a wide-area network. This necessitated converting the map production system from the Unisys mainframe computers to the VAX minicomputers, which the Bureau was able to accomplish without compromising its production deadlines. Because it did not have sufficient capacity on its own computers in the summer of 1988, the Bureau purchased time to do some of the map processing on a U.S. Department of Agriculture Univac computer in Fort Collins, CO.

By 1990, the Bureau needed to use its VAX computers for operations associated with the collection and tabulation of the 1990 census data. Therefore, the GEO, in developing its publication mapping system, decided to base the system on graphics workstations. It programmed much of the publication mapping system in the C-language to be used under the UNIX operating system on Tektronix 4335 graphics workstations. The workstations were linked to wide-area networks connected to the VAX computers for transferring the TIGER data in and out. Figure 5 shows the system flow for census publication maps. For publication-quality page-size artwork and negatives, the Bureau used a Scitex raster plotter at the USGS. Due to the high cost of these plotters and the relatively small use planned by the Bureau (about 12,000 different map sheets), it was cost-effective for the Bureau to have the USGS perform the plotting of these maps. In December 1988, the USGS and the Census Bureau amended their MOU: the Bureau would transfer funds to the USGS in fiscal year 1989 to establish a production system to support the Bureau's requirement for preparation of high-resolution, publication-quality map products after the 1990 census; the USGS would prepare all documentation necessary to acquire and install the required production system; and the Bureau would reimburse the USGS for any expenditures required to establish



the map production capacity and to offset the charges the USGS would incur for the production of map products to support the Bureau. The Bureau used the Scitex plotter, at a resolution of 508 dots per inch, to produce screened composite film positives. It delivered the maps to the USGS on magnetic tape as bit-image files.

## **GEOCODING ADDRESSES**

One of the noncartographic objectives of the TIGER System was an automated address-matching capability to assign each of almost 59 million residential addresses to the correct collection geography in the Nation's large urban areas. (Chapter 4, "Addresses and Questionnaire Printing," discusses in detail the acquisition and use of addresses for the 1990 census.) This assignment of addresses to geographic locations is called "geocoding." The primary role of automated geocoding was to provide a census geographic classification for each address. It did this by linking as many addresses as possible to the address ranges recorded for each side of the street segments in the TIGER data base. (This linkage also provided the geographic classification for controlling address list compilation and data collection activities as well as supporting tabulation and publication programs.) Products prepared for the geocoding operation provided the framework for structuring the ACF in TAR areas—the mailout/mailback enumeration areas that were based on computer-geocoded addresses.

### **TAR Geocoding**

In preparation for geocoding, the Bureau first delineated the TAR areas, purchased address files, and, from its internal records, created a file of 96,000 "special places"—places that have group quarters, which are living arrangements different from the typical house, apartment, or mobile home, such as college and university dormitories, prisons, hospitals, nursing homes, military barracks, and large rooming houses. The GEO delineated the TAR areas based on the maximum common areal extent of three types of coverage: (1) the USPS's city delivery service area, the area for which letter carriers classified by the USPS as "city carriers" delivered mail by structure number and street name; (2) the area covered by a commercial vendor's computerized residential address list; and (3) the coverage of address-range information contained in the TIGER data base—basically, the 1980 GBF/DIME-File areas enhanced by the new address-range information obtained for the MAW's by the geographic staff of the RO's during their updates of the FCM's. The GEO identified 340 coding areas, each consisting of one or more separate TAR areas. It also determined which ZIP Codes were located in the TAR areas, and provided this information to the Decennial Planning Division for use in procurement of an address file.

In order to geocode both the purchased addresses and the special-place addresses in the TAR areas, the Bureau extracted an address reference file from the TIGER data

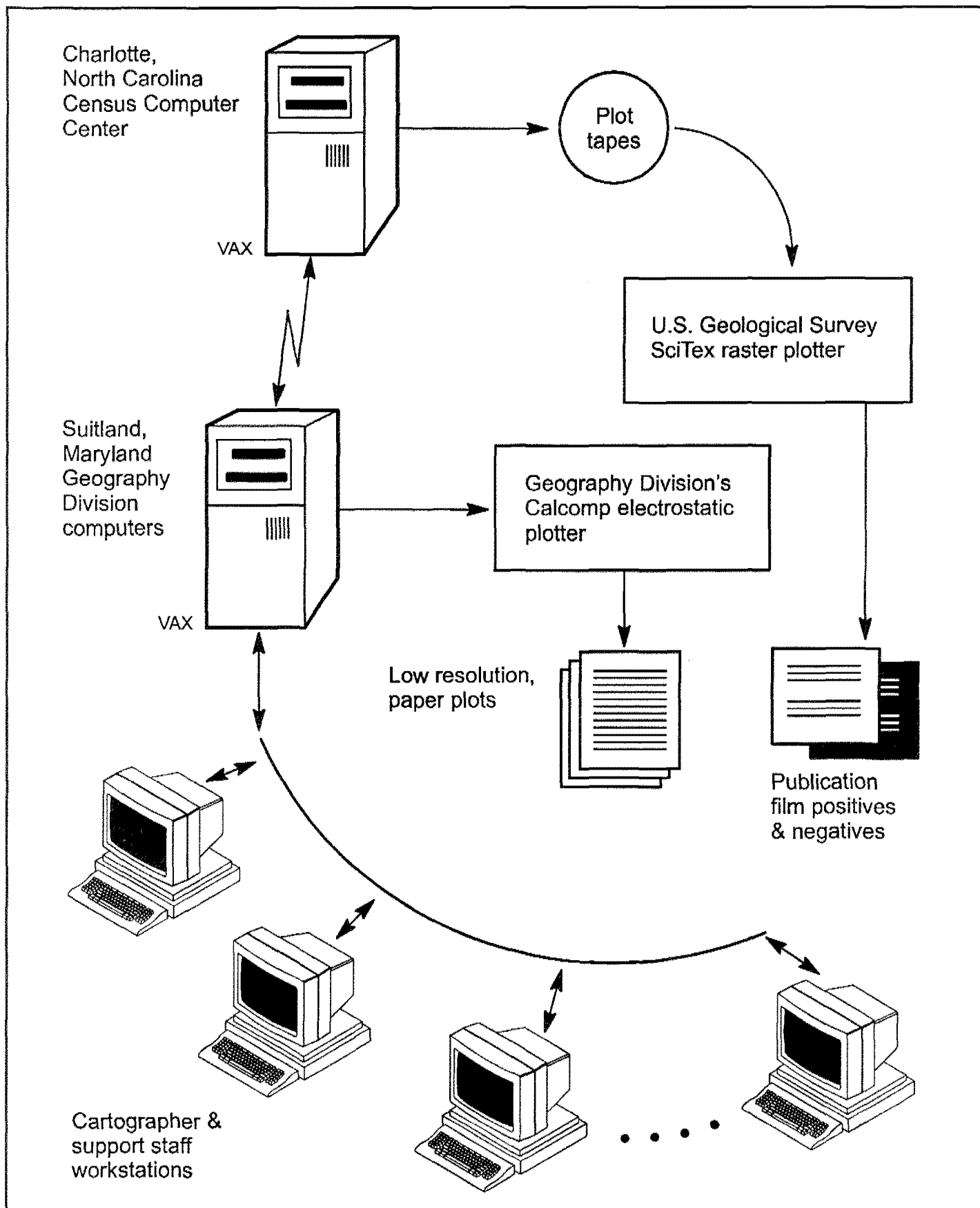
base. From the address-range coverage of the data base, the file included the street name and associated address range and ZIP Code(s) for each side of every street segment, together with the appropriate census codes. The Bureau used this file to perform automated matching of the structure number-street name/ZIP-Code addresses in the vendor file to the combination of street names/address ranges/ZIP Codes/census tracts/block numbers in the TIGER data base.

**First-cycle computer geocoding**—The Census Bureau geocoded the TAR area addresses in two cycles. The Decennial Operations Division (DOD) provided the GEO with approximately 55.4 million vendor addresses on a flow basis and the special-place file in a single delivery. A front-end processor standardized and reformatted the addresses into specific fields to allow matching against the address reference file. Then the automated coding system attempted to assign each address to the appropriate collection geography and recorded the geographic codes—DO, ARA, and census block—plus a walking-sequence number. Beginning at the northwesternmost corner of each block, the walking-sequence numbers chained addresses in a clockwise rotation around the block, thereby providing enumerators with an orderly route to follow in a later operation when they would verify and update the addresses in the field during an operation called "precanvass." Thus, the first computer-geocoding cycle resulted in (1) matched addresses with DO, ARA, census block, and walking-sequence numbers and (2) unmatched addresses resulting from incomplete or incorrect address information in the vendor file, discrepancies and missing address ranges in the address reference file, and addresses in the vendor file that were located outside the TAR area. It also identified special problems with some addresses in the file, such as an impossible address (e.g., a five-digit house number when it was impossible for that street to have addresses with more than four digits, or a street name that did not exist in the accompanying ZIP Code). Almost 75 percent of the addresses matched in this first cycle.

**Clerical resolution**—The GEO sent listings of 1.8 million address clusters—unmatched addresses with the same street name and within the same ZIP Code—together with separate listings of the 14.4 million individual addresses that made up the clusters, to the RCC's for clerical geocoding. The RCC staff plotted ARA geocoding maps for use as a reference, and reviewed the uncoded address clusters against local resource materials, including local-government or commercial maps showing addresses for streets, city directories, assessors' records, etc. They assigned address-range serial numbers to those addresses they were able to code to street-segment sides; these numbers provided a link to the TIGER standard-feature identifier when the address had to be corrected. When they could not assign a segment side serial number because a street was not in the TIGER data base, they assigned DO, ARA, and census block numbers instead of serial numbers.



Figure 5. The 1990 Census Publication Map Production System Flow



Note: Arrows represent metafile flows except where plotting is indicated.

If the office staff could not resolve an address cluster, field staff took the maps, cluster information, and lists of the individual addresses into the area to try to resolve the problem at the site. The RCC's also updated the maps to identify missing and incorrect street features and names, address ranges, and ZIP Codes.

The GUS sites in the RCC's (except San Francisco) used the annotated maps to update the TIGER data base by inserting the new and corrected address ranges, features, feature names, and ZIP Codes. (Note that adding a street could result in a block number now representing more than one polygon.) These enhancements improved the chances of achieving address matches during the second geocoding cycle. The DPD keyed the serial numbers and geocodes that the field staff had annotated on the lists of uncoded addresses and transmitted the information to headquarters, where the GEO appended the geocodes to the addresses in the vendor file. It also substituted standard feature identifiers for unacceptable addresses in the address file to facilitate subsequent matching.

**Advance post office check adds**—The first phase of the advance post office check (APOC) took place at the same time as the TAR geocoding operations in August-October, 1988. (This phase covered addresses in the TAR areas.) For the APOC, USPS letter carriers checked the vendor addresses on cards derived from the ACF for completeness, accuracy, and deliverability; they identified missing addresses (adds), undeliverable and duplicate addresses (potential deletes), and address corrections. Every address had to have a structure number and street name; the system could not accept mailing addresses that did not, such as post office box numbers. After return of the annotated cards, the DOD keyed the approximately 3.3 million adds and other changes and delivered the files to the GEO so it could match the addresses to an extract from the TIGER data base that contained updates from the clerical resolution operation. The updated file enabled the GEO to code as many APOC adds as possible. After review of the APOC adds against the addresses added by census enumerators during the prec canvass operation, the DOD printed the approximately 700,000 uncoded APOC adds on yellow cards for reconciliation in the field; this was part of the workload for the so-called "yellow card operation." (See ch. 4 for additional information about the APOC and yellow card operations.)

**Second-cycle computer geocoding**—After the first cycle of geocoding and clerical resolution, the GEO produced two TIGER extracts, one for the second-cycle geocoding and the other for structuring the TAR portion of the ACF. The first one, enhanced with both updated information from the geocoding resolutions and street-name improvements resulting from special GEO edits for name consistency, ensured that the second-cycle coding rate would improve. The DOD used the second TIGER extract to create a framework for the ACF consisting of street information and collection geography; the extract records contained information regarding feature name, street type, prefix/suffix

direction, address range, ZIP Code, State and county codes, and the collection geography (DO/ARA/block codes).

For the second cycle of computer geocoding, using an updated address file and the updated TIGER extract file, the GEO attempted to match all addresses, both uncoded and those that it had coded previously, subsequent to the first-cycle machine coding and clerical resolution, and again assigned collection geography and walking-sequence numbers. The computer applied the manually assigned geocodes if an address did not match the TIGER extract during the second cycle. Only machine coding of addresses occurred in the second cycle due to the limited time available. The GEO edited and delivered all address files to the DOD after second-cycle machine geocoding. Each address file contained a record for every address that had gone through the TAR geocoding. Uncoded records contained blank DO, ARA, census block, and walking-sequence fields. The address files then became part of the ACF.

The automated portion of the TAR geocoding operations took place in the GEO. About 86 percent of the purchased addresses were coded as a result of the automated match; more than an additional 13 percent were coded by the clerical and field operations in the 13 RCC's and the 7 processing offices. The TAR geocoding operations coded approximately 54.8 of the original 55.4 million purchased addresses, or virtually 99 percent. The remaining 577,500 addresses became part of the workload for field resolution via the aforementioned yellow card operation.

### **Place-of-Work, Place-of-Birth, and Migration Coding**

The Bureau tabulated decennial census data to report how many people worked in various geographic entities. It implemented a different system to geocode workplace addresses than it used for geocoding residential addresses, because the universe of addresses was much smaller and the need for site information was critical. Many respondents did not report their place of work with a structure number-street name address that would permit automated assignment to the correct geographic location—partly because some workplaces do not have or do not bother to use such addresses and partly because the employees do not know this information. Responses to the place-of-work question required the GEO to build a reference file of workplace names. This workplace file (WF) contained information about major employment sites, including the names of buildings, shopping centers, colleges, and military installations, and their addresses or locations. The Bureau also created and used other files, including a special address file from the economic censuses and a national geographic areas file (GAF), to geocode the workplaces. The address file provided address ranges for the urban cores of most UA's. The GAF contained official post office names, alternate post office names, county names, place names, selected MCD names, community and neighborhood names, and any variant spellings, together with their appropriate geographic codes. The GAF geocoded workplaces to the

county and MCD or place level, and the address file geocoded those in large urban areas to the block level.

The GEO developed the WF from various sources. The Bureau reasoned that the primary source for accurate workplace information should be local officials, and so it attempted to obtain participation from local government agencies to identify workplaces and their locations. A total of 309 agencies agreed to do so; they consisted primarily of local or regional transportation planning agencies, which the Bureau collectively referred to as metropolitan planning organizations (MPO's). For this operation, the Bureau provided copies of specially plotted TAR Geocoding/Workplace Spotting Maps and a preliminary version of some of the 1990 census's block-numbered maps to the MPO's, which used their knowledge of the area and locally available reference materials to try to assign each qualifying workplace to a 1990 census tract and block number. The Census Bureau requested that each MPO provide a file or list of workplaces with at least 20 employees. For each workplace, the MPO files included: (1) a workplace name and alternate name, if any; (2) a location description, consisting of a structure number-street name address, a description of its physical location, or a facility name if different from the workplace name; (3) the post office name; (4) the two-letter USPS State abbreviation, the county name, and the name of the incorporated place and/or MCD in which the workplace was located; (5) the ZIP Code and, if available, ZIP+4 Code; (6) the workplaces area code and telephone number (optional); (7) its employment size code, based on a Bureau-provided code list (optional); and (8) a unique serial number. For each workplace that did not have a structure number-street name address, the Bureau asked that the MPO's annotate the census maps by drawing a dot at the physical location of the workplace, entering a number next to the dot, and listing that number and the serial number for the associated workplace in the margin of the map. Some MPO's simply identified the census tract and block number for some workplaces, especially those that did not have a street address.

Other sources of workplaces and their locations included:

- Standard Statistical Establishment List (SSEL)—The SSEL is an inventory of all eligible establishments contacted by the Bureau for the 1987 economic censuses. An extract of this file provided information for use in the WF; the extract excluded inactive establishments, those without an adequate address, and those whose address did not represent the location of the establishment (such as a post office box or an address for a company official).
- Maps from colleges and universities—The GEO contacted 1,900 colleges and universities to obtain maps showing the physical location of their campuses and buildings and for directories listing the names and addresses of campus buildings.

- 1986 Shopping Center Directory—For each 1990 coding area, the Bureau entered into the WF all named shopping centers and their anchor stores listed in this published directory.
- Federal Aviation Administration (FAA) File of landing facilities—The GEO obtained a tape file of airports and other landing facilities from the FAA and extracted and added the pertinent information to the WF. It identified additional airports from the published Official Airlines Guide Travel Planner.
- Military installations—The GEO used the same list of military bases and Coast Guard stations that it had used for input of names as “key geographic locations” in the TIGER data base.
- Elementary, middle, secondary, and unified schools—The GEO extracted pertinent information from an internal Bureau file of public and private schools for the WF.
- Special place file—The 1990 census special place file compiled by the Bureau (see previous section on geocoding residential addresses) contained information for various residential facilities (such as hospitals, hotels, and prisons) that also were likely to be workplaces.

After collecting the workplace information, the GEO formatted the individual files into the WF structure and performed various computer and clerical edits to unduplicate and standardize the workplace names and location addresses. It then assigned as many workplaces as possible to the correct geographic codes, using both fully automated and computer-assisted clerical geocoding. During the place-of-work coding, clerks also added a number of significant workplaces that respondents reported on the census questionnaires, but were missing from the original WF.

The Census Bureau attempted to geocode place-of-work responses located in UA's to the block level and workplaces outside these areas to the block level if that information was available. Where block-level information was not available, the Bureau coded responses to the county and MCD or place level. The automated place-of-work coding, which the Bureau performed at headquarters, achieved a 96.5-percent match at the MCD or place level and a 50.3 percent match at the block level. The Bureau attempted to geocode the remaining workplaces in both computer-assisted and manual operations in the DPD and the Charlotte RCC. The final coding rate at the MCD or place level was 99.9 percent; for the workplaces it attempted to code to the block level, the Bureau was able to do so for 75.0 percent.

The Bureau also used automated geocoding to process place-of-birth and migration responses, but these operations used other reference files because they did not need the small-area geographic detail of the TIGER data base. The Bureau coded place-of-birth responses using a State and Foreign Country File, and coded migration information using both that file and the GAF. The automated matching using these files produced a 97.9-percent match for the

place-of-birth responses and a 94.8-percent match for migration responses. The Bureau coded the rest of the responses in a computer-assisted clerical operation in the DPD and the Charlotte RCC, resulting in successfully coding 99.8 percent of the responses for each operation.

## REFERENCE FILES

### Geographic reference files

Another noncartographic application of the TIGER System was the preparation of various reference files that would provide an inventory of collection geography relating the collection geographic entities to the tabulation geographic entities, and identify the names, relationships, codes, and other attributes for each geographic entity for which the Bureau tabulated data from the 1987 test census, the 1988 dress rehearsal census, and the 1990 decennial census. One type, the geographic reference files (GRF's), enabled the Bureau to organize the data tabulations for the redistricting data products required by P.L. 94-171, the summary tape files, and the published reports. For the 1980 census, the MRF fulfilled this function.

The GEO derived the GRF's from the GEO-CAT and the TIGER data base. It delivered a series of two GRF's to the divisions processing the census data. The first type of file, called the geographic reference file-codes (GRF-C), contained only code combinations that related the collection and tabulation geographic entities. The second type, called the geographic reference file-names (GRF-N), contained the names, codes, and other attributes for the appropriate geographic entities. The two files could be linked by the geographic codes that each contained. The GEO produced several versions of the GRF's in support of the test and dress rehearsal censuses, enumeration operations, cycle 1 block splits, precensus local review, cycle 2 block splits, late-receipt block splits, postcensus local review, Summary Tape File (STF) 1A data tabulations, publication of the data, and TIGER/Line® products; it also was prepared to issue a special GRF for use in the adjustment process, had it been needed. The Bureau used a standard format for all versions of the GRF, altering and updating the information as required for each specific census operation.

Each GRF-C contained geographic codes in variable-length binary records, with the geographic entities sequenced in an appropriate order. Each unique code combination formed a single record in the GRF-C; this GTUB-type record (see footnote 5) included a list of the block numbers (including suffixes) uniquely related to each combination of geographic entities. The GRF-N contained the codes, names, and attributes for the named geographic entities. It contained one record for each geographic entity and selected partial entities, sequenced by type of entity and then by geographic codes. The code or code combination for each entity provided the link with the GRF-C. The GRF-N contained entity "part" records only when needed to show selected data for entities in more than one jurisdiction, such as an American Indian reservation, MA,

or UA located in two or more States. The codes for MA's, census regions, and census divisions did not appear in the GRF-C, because these entities represent a combination of other entities. The codes were carried on their component entity records in the GRF-N; for example, the record for each component county (or county subdivision in New England) of a MA contained the appropriate MA code. This gave the file user the ability to recode these entities based on their components.

### Summary level files

In addition to the GRF's, the GEO provided summary level files (SLF's) needed to create the summary tape files and publication tables. While the GRF's enabled the Bureau to tabulate the 1990 census data for geographic entities, the SLF's enabled the Bureau to organize the data into the various geographic data presentations—inventory, summary, and hierarchical (see section on the geographic hierarchy). The SLF's identified the geographic components of each geographic entity for which the already-tabulated lower-level data were to be summarized for various data presentations in terms of the census geographic hierarchy; for example, a State and its counties, or the State, its counties, and their component county subdivisions. For 12 States where many of the MCD's represent significant units of local government, several summary levels identify the MCD's by various size cutoffs to facilitate the Bureau's ability to limit its data presentations to only those specific entities needed for certain tables in the publications. The SLF's contained not only the codes and names of geographic entities, but special attribute codes needed for publication of the data, population and housing counts, area measurements, and the coordinate values for "internal points." The GEO first produced SLF's for the Bureau's use in preparing the data products from the 1988 dress rehearsal census.

### TIGER, GIS, and Their Future

The Census Bureau designed the TIGER System not only to provide support for the 1990 census, but also to provide the geographic framework for geographic information systems (GIS) in the future. The generic definition of a GIS is a computer system that helps people discover relationships between and among sets of geographically referenced data that they could not see or understand easily without the aid of this technology. Geographically referenced information simply means "data identified according to location." Any variable that can be located spatially can be entered into a GIS. A GIS also may be defined as a computer system capable of assembling, storing, manipulating, and displaying geographically referenced data, together with the data that go into the system. Although the TIGER data base is not a GIS in the traditional sense, it provides polygons and the boundaries of geographic entities, and it links the codes identifying those entities directly with the underlying network of features and boundaries, and therefore it can form a valuable component of a GIS. The

geographic codes and names in the TIGER data base allow it to be used to create computerized maps that, in turn, can be linked with tabular census data. This merger of statistics and mapping produces the ability to perform spatial analysis of vast amounts of socioeconomic data. To enable users to access the information in the TIGER data base for GIS applications, the Bureau extracted a number of products that are not data-related. These various TIGER extract files are available to the public; see chapter 10 for details about the TIGER/Line® files and related products.

Thus, the usefulness of the TIGER data base did not end with its many internal uses for the 1990 census. The Census Bureau is committed to maintaining, improving, and updating this valuable resource on an ongoing basis, which will vastly increase its utility for and decrease the

geographic costs of the Bureau's other censuses and surveys. For example, in support of the 1992 economic censuses, the Bureau expanded the address range coverage in the TIGER data base to include almost all areas with a *structure number-street name address system* at the time of the 1990 census. This brought the number of addresses covered by the file to more than 85 million, or over 80 percent of the Nation's housing units. Having already proven invaluable for the 1992 economic censuses, the implementation of a new sample for the Bureau's several current surveys, and the special-census program, the Bureau is already proceeding with plans for using an ever-improving TIGER System in preparing for the 1997 economic and 2000 decennial censuses.

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## APPENDIX 3A.

# Glossary of Geographic Terms<sup>1</sup>

**address coding guide (ACG)**—A 1970 census file, created by the Census Bureau (usually in cooperation with local officials), consisting of a computerized inventory of the roads and streets in each of the 145 largest urban cores of metropolitan areas at the time of the 1970 census. Each ACG contained the names of the roads and streets in its coverage area, the address range, ZIP Code(s), and 1970 census geographic entity codes (down to the block level) associated with each block side of every street and road. The ACG's enabled the Bureau to perform automated assignment of the addresses on a mailing list to their geographic codes. The ACG's were the forerunners of the 1980 census's GBF/DIME-Files and the 1990 census's TIGER data base. See GBF/DIME-File and TIGER data base.

**address register area (ARA)**—A geographic entity established by the Census Bureau for 1990 census data collection purposes. An ARA usually consisted of an entire census tract or block group, but sometimes comprised only part of a census tract or block group. An enumerator's assignment usually consisted of one or more ARA's. ARA's were first used in the 1990 census. See collection geography and enumeration district.

**administrative entity**—A geographic entity legally established to fulfill a specific administrative function. Administrative entities usually have legally defined boundaries, often do not have elected officials, and cannot provide services to the public other than the specific function for which it was created. Administrative entities include voting districts, school districts, and governmentally nonfunctioning minor civil divisions such as election districts or precincts, county supervisor's districts, magisterial districts, and assessment districts. ZIP Codes also may be considered to be a type of administrative entity. See governmental unit, legal entity, and minor civil division.

**Alaska Native Regional Corporation (ANRC)**—A corporate entity established under the Alaska Native Claims Settlement Act of 1972, Public Law 92-203, as amended by Public Law 94-204. There are 12 ANRC's that together cover the State of Alaska except for the Annette Islands Reserve (an American Indian reservation). Each ANRC was designed to include, as far as practicable, Alaska

Natives with a common heritage and common interests. The boundaries of the ANRC's were established by the U.S. Department of the Interior in cooperation with Alaska Natives. The Bureau of Land Management, Department of the Interior, identified the ANRC boundaries for the 1990 census. A 13th corporation represents Alaska Natives who are not residents of Alaska and do not identify with any of the 12 corporations; no census products were prepared for the 13th corporation. The Bureau first tabulated decennial census data for ANRC's for the 1980 census. ANRC's have a five-digit FIPS code sequenced alphabetically within Alaska; the Bureau also assigned its own alphabetically sequenced set of two-digit codes to ANRC's to facilitate displaying them in a single list. See Alaska Native village and legal entity.

**Alaska Native village (ANV)**—A type of local governmental unit in Alaska that constitutes an association, band, clan, community, group, tribe, or village recognized pursuant to the Alaska Native Claims Settlement Act of 1972, Public Law 92-203, as amended by Public Law 94-204. The jurisdiction of an ANV may cover an extensive area, but ANV's do not have legally established boundaries. Accordingly, the Census Bureau identified only the densely settled portion of the village, or the area covered by an incorporated place or census designated place if such an entity was associated with the village, as an ANV for the 1980 census and as an Alaska Native village statistical area (ANVSA) for the 1990 census. An ANV may have included a substantial number of non-Native people. See Alaska Native village statistical area, legal entity, and statistical entity.

**Alaska Native village statistical area (ANVSA)**—A 1990 census statistical entity that represented the densely settled portion of an Alaska Native village (ANV). The Census Bureau's Seattle Regional Office delineated the boundaries of ANVSA's for review by officials of the nonprofit corporation within each participating Alaska Native Regional Corporation for the purpose of presenting decennial census data. ANVSA boundaries normally coincided with visible features and legal boundaries, but sometimes followed other nonvisible features; many ANVSA's were delineated to cover the same area as an incorporated place or census designated place if such an entity was associated with the ANV. To emphasize that these are statistical entities, the 1990 ANVSA's replaced the ANV's that the Census Bureau recognized for the 1980 census. An ANVSA may include a substantial number of people who are not Alaska natives. ANVSA's have a five-digit

<sup>1</sup>For further details on geographic entities, see the Census Bureau's 1994 publication, *Geographic Areas Reference Manual*. It also is available in electronic form from the National Technical Information Service, Springfield, VA 22161.

FIPS code sequenced alphabetically within Alaska; the Bureau also assigned its own alphabetically sequenced set of four-digit codes to ANVSA's to facilitate displaying them in a single list that also separately presented American Indian entities. See Alaska Native village, geographic code, and statistical entity.

**American Indian reservation**—An American Indian entity with boundaries established by treaty, statute, and/or executive or court order. The Federal Government has established reservations to legally identify the territory over which American Indians have governmental jurisdiction. These entities are designated as colonies, communities, pueblos, rancherias, reservations, and reserves. State-recognized reservations encompass legally defined areas that some State governments have deeded for the use of a specific tribe, but the tribe has no jurisdictional role within that area. The names and boundaries of federally recognized reservations were identified for the Census Bureau by the Bureau of Indian Affairs, U.S. Department of the Interior; appropriate State agencies identified the names and boundaries of the State reservations. Federal reservations may cross State boundaries, and Federal and State reservations may cross county, county subdivision, and place boundaries. For a reservation located in more than one State, only the portion of the reservation in a given State appears in the data products for that State; the entire reservation appears in data products for the United States. The 1990 census provided data for 307 American Indian reservations, plus 3 entities that comprised overlap areas claimed jointly by 2 reservations; the Census Bureau treated the small "joint areas" as if they were separate reservations for purposes of data presentation. The Bureau used a five-digit FIPS code (unique within State) and its own four-digit set of codes (to permit sequencing these entities alphabetically in a single nationwide list rather than by State) to represent American Indian entities. See geographic code, governmental unit, and legal entity.

**American Indian trust land**—Property held in trust by the Federal Government for the use and benefit of either a tribe (tribal trust land) or an individual member of that tribe (individual trust land). Such land always is associated with a specific federally recognized reservation or tribe, but may be located on or off a reservation; trust lands recognized for the 1990 census consisted only of such lands located outside a reservation boundary. Trust lands associated with a reservation or tribe may be located in more than one State. The Bureau first reported data for off-reservation tribal trust lands and some inhabited individual trust lands for the 1980 census. The Bureau of Indian Affairs, U.S. Department of the Interior, identified and provided maps of these areas for use by the Census Bureau. The Census Bureau used the same code scheme for trust lands as it did for American Indian reservations (see above). See legal entity.

**area measurement**—The extent of surface area, or its determination, of land and/or water within a specified

boundary. For the 1990 census, area measurements were calculated by computer and stored in the TIGER data base in square meters, based on the specific set of boundaries recorded for each entity in the TIGER data base. Census data presentations express area in square kilometers in all data products, and also in square miles in printed reports. By definition, census blocks do not include water within their boundaries; therefore, the water area of a block is always zero. Because crews-of-vessels geography by definition encompasses no territory and because ZIP Codes do not have fixed boundaries, these entities have no area measurements in the census products. The water figures include inland, coastal, Great Lakes, and territorial water.<sup>2</sup> The 1980 census provided area measurements of land and inland water for higher-level geographic entities (that is, *not* for census tracts/block numbering areas, block groups, or blocks) based on several sources, including manual digitization by Census Bureau staff of the boundaries shown on the census maps.

**block**—See census block.

**block group (BG)**—A combination of census blocks that is a statistical subdivision of a census tract or block numbering area (BNA). A BG consists of all blocks whose numbers begin with the same digit in a given census tract or BNA and is identified by that first digit; for example, BG 3 within a census tract or BNA includes all blocks numbered between 301 and 397. For data presentations, a geographic BG may be split in order to present data for every unique combination of county subdivision, place, American Indian/Alaska Native area, urbanized area, urban/rural classification, congressional district, and voting district shown in the data products; for example, if a city limit split BG 3—that is, BG 3 was partly in a city and partly outside the city—the Bureau provided separate data for each of the two parts of BG 3. The BG was the lowest level of geography for which the Census Bureau tabulated sample data in the 1990 census; the BG was used to tabulate sample data in the 1970 census only in the urban cores of 145 metropolitan areas, and in the 1980 census only for those areas that had block numbers, with enumeration districts serving that purpose everywhere else. The Census Bureau recommended that BG's contain 250-550 housing units, with an optimum size of 400; smaller BG's were acceptable in the Virgin Islands and the Pacific

<sup>2</sup>"Inland water" consists of any lake, reservoir, pond, or similar body of water that is recorded in the TIGER data base; it also includes any river, creek, canal, stream, or similar feature that is recorded in that data base as a two-dimensional feature (rather than as a single line). The portions of the oceans and related large embayments (such as the Chesapeake Bay and Puget Sound), the Gulf of Mexico, and the Caribbean Sea that belong to the United States and the outlying areas, out to the 3-mile limit, are considered to be coastal and territorial waters. The Bureau treats the Great Lakes as a separate water entity. Rivers and bays that empty into these bodies of water are treated as inland water from the point beyond which they are narrower than 1 nautical mile across. The Census Bureau's identification of land and inland, coastal, and territorial waters is for statistical purposes and for maintaining information in its geographic data base and does not necessarily reflect any legal definitions.

outlying areas. BG boundaries normally coincided with visible features and county lines, but sometimes followed other legal boundaries and nonvisible features. See statistical entity.

**block number**—See census block number.

**block numbering area (BNA)**—A statistical subdivision of a county for the purpose of grouping and numbering census blocks in counties that did not have census tracts. BNA's were equivalent to census tracts in the Census Bureau's geographic hierarchy. Similar entities, called "block areas," were first identified for the 1940 census, when the Bureau published data by block for all cities with 50,000 or more inhabitants. Officials of States and the outlying areas and the regional office geographic staff delineated the BNA's for the 1990 census; for previous censuses, only the Bureau delineated BNA's. The Bureau's guidelines for establishing BNA's were similar to those for the delineation of census tracts, except that BNA's could be less populated (1,500-8,000 people, or 600-3,000 housing units). For operational reasons or because of the small population of some counties, many were smaller than that; also, smaller BNA's were acceptable for the Pacific outlying areas. BNA boundaries normally coincided with visible features and county lines, but sometimes followed other legal boundaries and nonvisible features. For data presentations, a BNA may be split in order to present data for every unique combination of county subdivision, place, American Indian/Alaska Native area, urbanized area, urban/rural classification, congressional district, and voting district shown in the data products. The Bureau identified BNA's with a basic four-digit number from 9501 to 9989; for the 1980 census, BNA numbers ranged from 9901-9989. A two-digit suffix occasionally followed the basic BNA number; suffixes in the range .70 through .98 usually identified BNA's that the Bureau revised or created after it had numbered the census blocks, while a .99 suffix identified a crews-of-vessels BNA (see crews-of-vessels geography). Machine-readable products omit the decimal point from suffixed BNA numbers. See census tract and statistical entity.

**Boundary and Annexation Survey (BAS)**—A Census Bureau survey of a specified universe of governmentally functioning counties and statistically equivalent entities, minor civil divisions, consolidated cities, and incorporated places, to determine the inventory of legally defined entities and their names, legal descriptions, and official boundaries as of January 1 of the survey year. The survey also collected information about each legal action that implemented a boundary change or changed the inventory of legal entities. The Bureau sent the results of each survey to a State certifying official for review and certification of the accuracy of all the reported actions.

**census area**—A statistical entity in Alaska that serves as the equivalent of a county. Census areas were delineated cooperatively for the 1980 census by the State of Alaska

and the Census Bureau in order to provide smaller geographic units for the portion of Alaska legally designated as the unorganized borough; that is, the parts of Alaska that do not lie within an organized borough, which is an entity that the Bureau treats as the statistical equivalent of a county. See county and statistical entity.

**census block**—The smallest entity for which the Census Bureau collects and tabulates census data. A census block consists of one or more polygons that are bounded on all sides by visible and nonvisible features, including legal boundaries, that appear on the census maps. The 1990 census for the first time divided the entire United States and the outlying areas into census blocks. For the 1980 census, the census block program covered all urbanized areas and usually some adjacent territory, all incorporated places with an estimated population of 10,000 or more, and areas for which State and local agencies contracted with the Census Bureau for block data. The Census Bureau first published census data by block for the 1940 census as part of the new Census of Housing. See census block number, collection block, statistical entity, and tabulation block.

**census block number**—A three-digit number assigned to each polygon or a group of polygons formed by physical features, county lines, and census tract/block numbering area boundaries. The 1990 census blocks were numbered from 101-197, 201-297, 301-397, 401-497, 501-597, 601-697, 701-797, 801-897, and 901-997. In the 1990 census, for the first time, a block number also could have a single alphabetic suffix if the original block was split by the boundary of a legal or statistical entity, such as a city limit; for example, block 206 could be divided into two blocks numbered 206A and 206B. For post-1990 census block splits made as a result of late-received information about the location of boundaries, the Bureau added a second alphabetic suffix (even if there was no first one; e.g., block 206A would be split into two blocks numbered 206AA and 206AB, and block 207 into 207A and 207B); the Bureau did not publish data for these blocks. Crews-of-vessels blocks had a unique block-number suffix of "Z" (see crews-of-vessels geography). The 1990 census block numbers applied only to land area; bodies of water were assigned special block numbers that appear in the TIGER data base and the TIGER/Line® products, but not in any data products or on any census maps. See census block, collection block, and tabulation block.

**census county division (CCD)**—A statistical subdivision of a county, established cooperatively by the Census Bureau and State and local government officials, for the presentation of decennial census data in 21 States that either did not have legally established minor civil divisions (MCD's), or in which the MCD's did not serve legal or administrative purposes, were not well known, had poorly defined boundaries, and/or had frequent boundary changes; that is, the existing MCD's generally were unsatisfactory for the collection, presentation, and analysis of census data.

CCD boundaries normally coincide with visible features and county lines, but sometimes follow other legal boundaries and nonvisible features. See census subarea, county subdivision, minor civil division, statistical entity, and unorganized territory.

**census designated place (CDP)**—A statistical entity, defined for each decennial census according to Census Bureau guidelines, comprising a settled concentration of population that is not within an incorporated place but is identified locally by a name. Potential CDP's for the 1990 census were delineated cooperatively by State, tribal, local officials, census statistical areas committees, and the Bureau's regional office geographic staff. Insofar as possible, the boundaries of CDP's coincide with visible features and the boundaries of counties/county equivalents, county subdivisions, and incorporated places. To qualify for recognition in the 1990 census, CDP's had to meet specific population thresholds:

Inside urbanized areas: 2,500 (except in Hawaii and Puerto Rico)

Outside urbanized areas: 1,000 (in the conterminous United States)

Alaska: 25 (outside of urbanized areas)

Hawaii, Virgin Islands, and the Pacific outlying areas: 300

Puerto Rico: comunidad: 1,000; zona urbana: no minimum

American Indian reservations: 250 (outside of urbanized areas)

The Bureau referred to these entities as unincorporated places for the 1940-1970 censuses. CDP's in Puerto Rico were called comunidades (formerly aldeas) and zonas urbanas (see both terms). The Bureau recognized CDP's as qualifying for inclusion in the 1990 census data tabulations based on the preliminary population counts it tabulated for the postcensus local review program, rather than the final counts that had been the basis in previous censuses. See incorporated place, place, and statistical entity.

**census division**—See division.

**census feature class code (CFCC)**—A three-character alphanumeric code assigned to each point, line, area, and key geographic location in the TIGER data base to identify uniquely each one's basic map-related characteristics (attributes). The first character is an alphabetic code that identifies the general class of feature (such as a road), followed by a two-character numeric code that provides a more detailed classification (such as "divided limited-access highway not in tunnel").

**census geography**—A collective term referring to the geographic entities used by the Census Bureau in its data collection and tabulation operations, including their structure, types, and relationships to one another.

**census region**—See region.

**census statistical areas committee (CSAC)**—A committee established by local officials and other interested individuals to identify and delineate, within their area of jurisdiction (usually one or more counties or a metropolitan area), census tracts, block groups, census designated places, and other statistical entities, following Census Bureau guidelines. The committee also serves as a liaison between data users and the Bureau. CSAC's generally include representatives from all or some of the following types of organizations: regional, county, incorporated place, county subdivision governmental agencies, councils of government, economic development agencies, chambers of commerce, neighborhood associations, colleges and universities, social service organizations, citizen's groups, newspapers, public utilities, business firms, and nonprofit organizations. Although many CSAC's have existed for several decades, the Bureau requires that they be officially reestablished before each decennial census. A person designated by the CSAC to act as its contact person with the Bureau is called the census statistical areas key person. The CSAC's were referred to as census tract committees until 1973.

**census subarea**—A statistical division of a borough or census area in Alaska, equivalent to a census county division in other States. Census subareas, first defined for the 1980 census, were delineated cooperatively by officials of Alaska and the Census Bureau. See census county division, county subdivision, statistical entity.

**census tract**—A small, relatively permanent statistical subdivision of most counties in metropolitan areas and some counties in nonmetropolitan counties. Census tracts were first established for a few large cities for the 1910 census. Census tracts were delineated by a local committee of census data users—the census statistical areas committee (CSAC)—for the purpose of presenting decennial census data. The Census Bureau recommends that census tracts contain between 2,500 and 8,000 inhabitants, and that their boundaries follow easily identifiable map features; it also recommends that, when first established, they should be relatively homogeneous with respect to population characteristics, economic status, and living conditions. Although census tract boundaries normally coincide with visible features and county lines, they sometimes follow other legal boundaries and nonvisible features. The areal size of census tracts varies widely, depending on the density of settlement. For data presentations, a census tract may be "split" in order to present data for every unique combination of county subdivision, place, American Indian/Alaska Native area, urbanized area, urban/rural classification, congressional district, and voting district shown in the data products. The Bureau identified census tracts with a basic four-digit number (including leading zeroes) from 0001-9499, possibly followed by a two-digit suffix; for the 1990 census, suffixes in the range

.70 through .98 usually identified census tracts that the Census Bureau revised or created after it had numbered the census blocks, while a .99 suffix identified a crews-of-vessels census tract (see crews-of-vessels geography). Census maps and the published reports do not display leading zeroes, and machine-readable products omit the decimal point from the suffixed census tract numbers. Census tract numbers are always unique within a county and often unique within a metropolitan area; a few counties or county subdivisions in metropolitan areas have block numbering areas rather than census tracts. Six States (California, Connecticut, Delaware, Hawaii, New Jersey, and Rhode Island) and the District of Columbia were covered entirely by census tracts for the 1990 census. See block numbering area, census statistical areas committee, and statistical entity.

**central city**—The core place(s) and/or county subdivision(s) of a metropolitan area (MA), as designated by the Office of Management and Budget following official published standards. (Some primary metropolitan statistical areas do not have a central city.) For the 1950-80 censuses, central city also applied to the core incorporated place(s) of an urbanized area. If part of a central city was outside its MA, the term applied only to the portion of the place within the MA. See central place, consolidated metropolitan statistical area, metropolitan area, metropolitan statistical area, and primary metropolitan statistical area.

**central place**—The core place(s) of an urbanized area (UA), usually consisting of the most populous place(s) in the UA. Central places were identified by the Census Bureau following published criteria. Formerly referred to as central city, the Bureau introduced the term central place for the 1990 census to recognize that census designated places also could be central places, as well as to avoid confusion with the metropolitan area central city. If a central place was an extended city, the term applied only to the portion of the place within the UA. See central city, extended city, urbanized area.

**centroid**—See internal point.

**code**—See geocoding and geographic code.

**collection block**—A physical block or a group of polygons identified by a unique three-digit number on the 1990 census maps used during the address allocation and census enumeration operations. The Census Bureau enumerated each collection block as a single geographic area regardless of any legal or statistical boundaries that passed through it. See census block, census block number, collection geography, and tabulation block.

**collection geography**—The geographic entities used by the Census Bureau to take a census. For the 1990 census, collection geography consisted of the combination of district office/address register area/collection block; for the

1980 census, district office/enumeration district/census block. Where there were no 1980 census block numbers, the enumerator maps contained administrative block numbers that had been hand-written by Data Preparation Division staff to help guide the enumerator around the enumeration district; enumerators listed the numbers in their address listing books (address registers), but the numbers were not recorded in the Bureau's computer files. See address register area, collection block, enumeration district, and tabulation geography.

**comunidad**—A type of census designated place in Puerto Rico for the 1990 census, required to have a minimum population of 1,000 to qualify for recognition in the data presentations. In previous decennial censuses, this entity was called an "aldea." See census designated place, statistical entity, and zona urbana.

**congressional district (CD)**—An area established by State officials or the courts for the purpose of electing a person to the U.S. House of Representatives. After each decennial census, the Congress reapportions the 435 seats in the House among the States based on the new population counts; thus, the number of CD's in a State may change after each decennial census. Within each State, the CD's must contain, as nearly as possible, an equal number of people based on the most recent decennial census; accordingly, following the reapportionment, each State is responsible for redrawing its CD's to meet this requirement. States may realign the boundaries more than once during a decade. The data reported for CD's in the 1990 census reflect the districts in effect on January 1, 1990, for the 101st Congress. The Bureau provided separate data tabulations and published maps for the districts of the 103rd Congress, the first one that used the CD's that had been reapportioned and redrawn based on the 1990 census. It subsequently prepared data retabulations and new maps for the six States (Georgia, Louisiana, Maine, Minnesota, South Carolina, Virginia) that revised some or all of their CD boundaries for the 104th Congress; this information is available only via electronic media. CD's have a two-digit FIPS code that is unique within State. See geographic code and legal entity.

**consolidated city**—An incorporated place that has combined its governmental functions with a county or county subdivision, but both continue to exist as legal entities, and the place contains one or more other incorporated places that continue to function as local governments within the consolidated city. Six places were consolidated cities for the 1990 census: Butte-Silver Bow, MT; Columbus, GA; Indianapolis, IN; Jacksonville, FL; Milford, CT; and Nashville-Davidson, TN. Each consolidated city is identified by a five-digit FIPS code that is unique within State and a Census Bureau code that consists of a single alphabetic character (to enable the Bureau to present data for these entities separately). See geographic code, governmental unit, incorporated place, and legal entity.



**consolidated metropolitan statistical area (CMSA)**—A geographic entity defined by the Office of Management and Budget (OMB) based on published standards, for use as a statistical entity by Federal agencies. An area qualifies to be a CMSA if it qualifies as a metropolitan statistical area, has a population of 1,000,000 or more, has component parts qualifying for recognition as separate primary metropolitan statistical areas, and local opinion favors the designation. CMSA's consist of two or more counties except in New England, where they consist of county subdivisions. Designations of CMSA's were first published by the OMB in June 1983 and went into effect on June 30, 1983. Before that, CMSA's were approximated by (but not the same as) standard consolidated statistical areas (SCSA's) and, even earlier, standard consolidated areas (SCA's). The Census Bureau tabulated 1990 census data for the CMSA's in effect on January 1, 1990. Based on the results of the 1990 census, the OMB changed some CMSA designations in June 1993; the Bureau retabulated and published 1990 census data to reflect the 1993 CMSA's. CMSA's have a four-digit FIPS code sequenced alphabetically with all other metropolitan areas; to enable users to deal only with CMSA's, the four-digit metropolitan area code for a CMSA uniquely always ends in "2." CMSA's also have a two-digit FIPS code (to provide an interface with the codes used for the former SCSA's), sequenced alphabetically. See central city, geographic code, metropolitan area, metropolitan statistical area, primary metropolitan statistical area, and statistical entity.

**conterminous (United) States**—The contiguous 48 States and the District of Columbia; that is, the United States excluding Alaska and Hawaii. Also referred to as the Lower 48 States.

**county, county equivalent**—The primary legal subdivision of most States. In Louisiana, **parishes** serve as the equivalents of counties; in Alaska, **boroughs** do so for a portion of its territory; and the State of Alaska and the Census Bureau delineated statistical entities called **census areas** to cover the remainder of the State. Four States have **independent cities** that are governmentally independent of county organization; there were 41 such cities in Virginia in 1990, and one each in Maryland, Missouri, and Nevada. The part of Yellowstone National Park in Montana is not within any county, and therefore the Bureau treats it as a county equivalent. The District of Columbia has no primary administrative divisions, so the Census Bureau treats its entire area as the statistical equivalent of a county. In the outlying areas, the Census Bureau treats the following entities as the equivalents of counties for statistical purposes: American Samoa, 3 districts and 2 islands; Guam, the entire island; Northern Mariana Islands, 4 municipalities; Palau, 16 states; Puerto Rico, 78 municipalities; and the Virgin Islands of the United States, 3 islands. The counties recognized in 1990 census data products were those reported to the Census Bureau as legally in existence on January 1, 1990, under the laws of their

respective States. (Note that the Bureau treated the entities called counties in American Samoa as minor civil divisions.) Counties and statistically equivalent entities have a three-digit FIPS code sequenced alphabetically within State, with the exception of independent cities, which alphabetically follow the other county-level entities. See census area, geographic code, governmental unit, and legal entity.

**county subdivision**—The primary legal or statistical subdivision of a county or county equivalent. In several States, all or some incorporated places are not located in any minor civil division, and therefore the Bureau treats these places as both county subdivisions and places. County subdivisions have a five-digit FIPS code assigned alphabetically within State; for census county divisions and for governmentally nonfunctioning minor civil divisions in some States with large numbers of such entities, these county subdivisions alphabetically follow the other entities in the FIPS 55 file. In addition, the Census Bureau assigned county subdivisions its own set of three-digit codes to enable it to sequence these entities alphabetically within each county. See census county division, census subarea, geographic code, minor civil division, and unorganized territory.

**crews-of-vessels geography**—The special treatment given in the decennial census to ensure suitable geographic allocation of the data for shipboard populations of U.S. Navy, U.S. Coast Guard, and merchant marine vessels. The Census Bureau counted crew members who did not report an off-ship residence as residents of the ship, which the Bureau allocated to the waters adjacent to the land area that contained the facility, pier, or dock associated with the ship. The Bureau based this location on the homeport of each Navy and Coast Guard vessel; for maritime ships, it was the port where the vessel was docked on April 1, 1990 (Census Day) or, if at sea, the port of departure or destination (the port had to be in the United States or an outlying area). Each vessel was assigned the basic four-digit number of the census tract/block numbering area (BNA) of the associated land area followed by a suffix of .99, and the land block number followed by the suffix "Z." The crews-of-vessels geography appears on the 1990 census block maps with an anchor symbol in the water, accompanied by its census tract/BNA and block numbers. The TIGER/Line® files assign a tiny triangle of land to the crews-of-vessels geography. Crews-of-vessels geography is more conceptual than real, since it has no true location, no boundary, and can have no area measurements.

**division**—A grouping of contiguous States (including Alaska and Hawaii) and the District of Columbia within a region, established by the Census Bureau for the presentation of census data (see map in app. 3B). The current nine divisions were designed to represent areas that were



relatively homogeneous physiographically, historically, economically, and demographically when the Bureau established them in 1910. They have remained unchanged except for the addition of Alaska and Hawaii to the Pacific Division in 1960 following their attainment of statehood. Each division has a two-digit Census Bureau code; the first digit identifies the census region within which the division is located, and the second represents the division in geographical order within its region. See geographic code, region, and statistical entity.

**enumeration district (ED)**—A small geographic entity established by the Census Bureau as a basic unit for data collection and tabulation in a decennial or special population census from 1870 through 1987. An ED usually represented the area assigned to an individual enumerator. Because the Bureau also used ED's as the basis for data tabulations, it delineated them so that all area included in an ED would be in the same higher-level geography. If the boundary of a tabulation entity changed after the ED's had been defined so that it now passed through a collection ED, the Bureau split that ED and added an alphabetic suffix to its four-digit number to provide a unique tabulation-ED identifier for each portion of the original ED that was in a different geographic entity; for example, if a city changed its boundary so that the city limit ran through ED 17, the portion inside the city was identified by ED 17A and the portion outside by ED 17B. The Bureau identified ED's with a four-digit number (including leading zeroes), possibly followed by a single alphabetic suffix. For the 1970 and 1980 censuses, the Bureau replaced the ED with the block group as the lowest level of geography for which the Bureau tabulated sample data in some (1970) or all (1980) areas that had block numbers. For the 1990 census, the address register area replaced the ED for data collection, and the block group replaced it for data presentation. See address register area, block group, collection geography, and tabulation geography.

**extended city**—An incorporated place that contained large, sparsely settled area(s) within its legally defined boundaries. The Census Bureau's criteria required that one or more areas within the place had a population density of fewer than 100 people per square mile, each such area was at least 5 square miles in extent, and the areas together constituted at least 25 percent of the places total land area or at least 25 square miles. The Bureau classified the low-density portion of the extended city as rural and the remainder as urban. For the 1970 and 1980 censuses, the Bureau identified extended cities only for incorporated places within urbanized areas (UA's); for the 1990 census, the Bureau also applied the concept to places outside UA's. See incorporated place, urban, and urbanized area.

**GBF/DIME-File** (Geographic Base File/Dual Independent Map Encoding File)—A file created by the Census Bureau, usually in cooperation with local officials, representing the line segments and related geographic attributes that comprised all or part of the map features in the core of an

urbanized area. Each file contained the name of each segment of a mapped feature; the address ranges and ZIP Codes, if applicable, for both sides of each street segment; node numbers that identified feature intersections and selected points of a curved line; and x,y coordinate information for each node in the file. Many GBF/DIME-Files had been created to facilitate the place-of-work coding operation for the 1970 census, and therefore contained the 1970 geographic entity information for both sides of the segments; as these files were updated for the 1980 census and the 1970 census's address coding guides were converted to the GBF/DIME format, they were revised to include the 1980 census geographic entity information. Because the GBF/DIME-Files contained extensive information describing the street network and address ranges in the Nation's major urban centers, the Bureau used them as a basic source to build the TIGER data base. See address coding guide, metropolitan area window, TAR area, and TIGER data base.

**geocoding**—The assignment of an address, structure, key geographic location, or business name to a location that is identified by one or more geographic codes. See geographic code.

**geographic code**—One or more alphanumeric characters used to identify a geographic entity. Using codes rather than names facilitates working with geographic entities in a computer environment, especially for maintaining a particular sequence of entities and for processing information and analyzing data associated with them. Geographic codes are shown primarily in the Census Bureau's machine-readable products, but also appear in some other products, such as microfiche, and on some decennial census maps. The Bureau uses codes published as official Federal Information Processing Standards (FIPS codes) by the National Institute of Standards and Technology, U.S. Department of Commerce, in its FIPS Publication (FIPS PUB) series: States and statistically equivalent entities (FIPS PUB 5), counties and statistically equivalent entities (FIPS PUB 6), metropolitan areas (FIPS PUB 8), congressional districts (FIPS PUB 9), and county subdivisions, places, Alaska Native entities, each State's portion of American Indian reservations, and other American Indian geographic entities (FIPS PUB 55). (FIPS code documentation and files are available from the National Technical Information Service, Springfield, VA 22161.) The Bureau assigned its own codes, sometimes with input from local officials, to entities not covered by FIPS codes—census regions and divisions, urbanized areas, voting districts, school districts, traffic analysis zones, public-use microdata areas, census tracts, block numbering areas, block groups, and blocks—and to several entities that also have FIPS codes: States, American Indian and Alaska Native entities, county subdivisions, sub-MCD's, places, and consolidated cities. In addition, the U.S. Postal Service assigns a two-character alphabetic code to each State and statistically equivalent entity. The specific coding scheme used by the Bureau for

each type of geographic entity is noted in this glossary in the text for that entity. In addition to codes for individual entities, the Census Bureau also used codes that describe specific attributes of geographic entities, such as the type of entity, its functional status (e.g., active governmental unit, statistical entity), and type of American Indian/Alaska Native entity). See geocoding.

**geographic entity**—A geographic unit of any type—legal, administrative, or statistical. See administrative entity, legal entity, and statistical entity.

**geographic hierarchy**—A system of relationships among geographic entities in which each geographic entity (except the smallest one) is subdivided into lower-order units that in turn may be subdivided further. For example, States are subdivided into counties, which are subdivided into county subdivisions. Most 1990 census reports and data files present statistics in all or part of the following hierarchical sequence (also see figure 1 in the text):

- United States
  - region
    - division
      - State
        - county
          - county subdivision
            - place or place part
              - census tract/block numbering area (BNA) or census tract/BNA part
                - block group (BG) or BG part
                  - block

This structure reflects the legal and/or geographic relationships between each of the entities. Thus, for example, places (or parts of places) are shown as subordinate to county subdivisions, which in turn are subordinate to counties, which in turn are subordinate to the State. The treatment of places is geographic, whereas the others reflect legal as well as geographic reality. That is, MCD's legally (and therefore geographically) *never* cross county lines, and counties *never* cross State lines. Places, however, are unique subdivisions of a State, and so may cross the boundaries of counties and county subdivisions (but *never* the boundary of a State); because a place may be located in two or more counties, the Bureau must show the part in each county when the presentation reflects the above hierarchy. Similarly, census tracts/BNA's are always unique subdivisions of a county, but may cross the boundaries of county subdivisions and places; BG's are always unique within census tract/BNA, but, just as the boundary of a higher-level geographic entity may split a census tract/BNA, it also may split one or more BG's within that census tract/BNA. A physical block that is split by the boundary of a legal or statistical entity will display a unique block number for the portion on each side of that boundary; thus, 1990 census block numbers are *always* unique within all higher-level geography.

**geographic tabulation unit base (GTUB)**—The smallest unique combination of geographic entities, above the block

group level, required for tabulating data from a census or sample survey; for example, the unique combination of the portion of voting district 17 in census tract 1223 in city Z in township Y is a GTUB.

**governmental unit (GU)**—A geographic entity established by legal action for the purpose of implementing governmental functions. Most GU's have legally defined boundaries, elected officials, and the legal power to raise revenues and provide services. A few GU's choose not to have officials or implement their powers, and the Bureau refers to such entities as inactive GU's. All area and population of the United States are located in one or more GU's, such as American Indian reservations, States, counties, county subdivisions, and incorporated places. See administrative entity and legal entity.

**incorporated place**—A type of governmental unit, incorporated under State law as a city, town (except in New England, New York, and Wisconsin), borough (except in Alaska and New York), or village, having legally prescribed boundaries, powers, and functions to administer and serve a concentration of population. In several States, all or some incorporated places are not located in any minor civil division, and therefore the Bureau treats these places as both county subdivisions and places. The incorporated places recognized in 1990 census data products were those reported to the Census Bureau as legally in existence on January 1, 1990, under the laws of their respective States. See census designated place, extended city, governmental unit, legal entity, minor civil division, and place.

**independent city**—See county.

**internal point**—A latitude/longitude coordinate value for a point that represents the approximate center (centroid) of a polygon in the TIGER data base. Where possible, the internal point is a true centroid, but often it is not in order to ensure that it lies within its polygon, to avoid being in another polygon within its boundaries (such as a body of water or a street-enclosed area that forms another census block), or to respond to operational requirements.

**key geographic location**—A structure or area, such as an apartment building, workplace, shopping center, or industrial park, for which it is desirable to provide the name as an alternative to a street address for automated name-matching capability for geocoding purposes.

**legal entity**—A geographic entity whose boundaries, name, origin, and description (e.g., county, city, township) result from charters, laws, treaties, or other governmental or administrative action. (A few legal entities do not have official boundaries.) Legal entities that the Census Bureau has recognized for the decennial census at one time or another include American Indian reservations and trust lands, States and statistically equivalent entities, counties and statistically equivalent entities, minor civil divisions

(MCD's), sub-MCD's, incorporated places, consolidated cities, Alaska Native Regional Corporations, Alaska Native villages, congressional districts, voting districts/election precincts, city wards, and school districts. The term political area often was used in earlier censuses. See administrative entity, governmental unit, and statistical entity.

**metropolitan area (MA)**—A geographic entity that identifies a large population nucleus, together with adjacent communities that have a high degree of economic and social integration with that nucleus. MA's are designated by the Federal Office of Management and Budget (not the Census Bureau), following a set of published standards and based on census data, for use as a statistical entity by Federal agencies. The term metropolitan area officially became a generic term in 1983 to refer to all classifications of MA's: metropolitan statistical areas (MSA's), consolidated metropolitan statistical areas (CMSA's), primary metropolitan statistical areas (PMSA's), and New England county metropolitan areas (NECMA's—note that the Bureau does not provide decennial census data for NECMA's). MA's have a four-digit FIPS code sequenced alphabetically, with CMSA's also having a two-digit FIPS code. See central city, consolidated metropolitan statistical area, geographic code, metropolitan statistical area, primary metropolitan statistical area, and statistical entity.

**metropolitan area window (MAW)**—The portion of each metropolitan or other area that was covered by a GBF/DIME-File for the 1980 census, extended for the 1990 census to the edges of USGS 7.5-minute (1:24,000-scale) map sheets (see figure 4 in the text). In some cases, the Census Bureau extended a file to cover only the north or south half of a 7.5-minute map sheet; in a very few instances (where a GBF/DIME-File had only a few street segments in a 7.5-minute map sheet), it reduced the content of a file to the edge of a map sheet. In MAW's, the Census Bureau substituted the GBF/DIME-File coverage for the USGS map coverage when it created the TIGER data base. See GBF/DIME-File.

**metropolitan statistical area (MSA)**—A geographic entity defined by the Office of Management and Budget based on published standards for use as a statistical entity by Federal agencies. An MSA consists of one or more contiguous counties (county subdivisions in New England) that contain a core area with a large population nucleus, as well as adjacent communities having a high degree of economic and social integration with that core. The core area must include a place with a census population of 50,000 or more, or be an urbanized area (UA); if an MSA qualifies on the basis of having a UA (and no place with a population of at least 50,000) as its core, the total MSA population must be at least 100,000 (75,000 in New England). The county(ies) with a substantial portion of the population in one or more UA's comprise the central county(ies) of an MSA; contiguous counties can be added on the basis of a combination of commuting rates into the central counties

and measures of metropolitan character, such as population density and percentage of population that is urban. Designations of MSA's were first published in June 1983 and went into effect on June 30, 1983. Before that, MSA's were called standard metropolitan statistical areas (SMSA's) and, even earlier, standard metropolitan areas (SMA's). The Census Bureau tabulated 1990 census data for the MSA's in effect on January 1, 1990. Based on the results of the 1990 census, the OMB changed many MSA designations in June 1993; the Bureau retabulated and published the 1990 census data to reflect the 1993 MSA's. MSA's have a four-digit FIPS code sequenced alphabetically with all other metropolitan areas. See central city, consolidated metropolitan statistical area, geographic code, metropolitan area, primary metropolitan statistical area, and statistical entity.

**minor civil division (MCD)**—A type of legal entity that the Census Bureau recognized as the primary legal subdivision of a county/county equivalent in 28 States and the outlying areas. MCD's are identified by a variety of terms, primarily township, town, district, precinct, and barrio. Many MCD's represent local, general-purpose governmental units, but many others do not have their own governments and exist only for administrative purposes. The MCD's recognized in 1990 census data products were those reported to the Census Bureau as legally in existence on January 1, 1990, under the laws of their respective States. For the 12 States where many MCD's serve as general-purpose governments performing substantial governmental functions (Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin), the 1990 census provided a larger array of data than it did for county subdivisions in other States—that is, the same data that it provided for places of comparable population. See census county division, county subdivision, governmental unit, legal entity, sub-MCD, and unorganized territory.

**outlying area**—A primary entity, other than a State or the District of Columbia, under the jurisdiction of the United States at the time of the 1990 census, including American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Republic of Palau, Puerto Rico, and the Virgin Islands of the United States. The Census Bureau also published 1990 census population counts (but no demographic characteristics) for the following entities under U.S. jurisdiction: Baker, Howland, and Jarvis Islands; Johnston Atoll; Kingman Reef; Midway Islands; Navassa Island; Palmyra Atoll; and Wake Island, referred to collectively as the "U.S. minor outlying islands." Previous censuses included other outlying areas, such as the Trust Territory of the Pacific Islands and the Canal Zone. Each outlying area has a two-digit FIPS code, sequenced alphabetically following the FIPS codes for States; each also has a two-character alphabetic code assigned by the U.S. Postal Service. See geographic code, governmental unit, legal entity, and State.

**place**—A concentration of population either legally established as an incorporated place or consolidated city, or delineated for a decennial census as a census designated place. Places have both a five-digit FIPS code and a four-digit Census Bureau code assigned alphabetically within State; the census codes exist for internal operational purposes, but also to provide data users with an interface to the place codes used for the 1980 census. See census designated place, consolidated city, extended city, geographic code, and incorporated place.

**primary metropolitan statistical area (PMSA)**—A geographic entity defined by the Office of Management and Budget (OMB) based on published standards for use as a statistical entity by Federal agencies. If an area meets the requirements to qualify as a metropolitan statistical area (MSA) and has a population of 1 million or more, the OMB may designate two or more PMSA's within it if the criteria are met and local opinion favors the designation. A PMSA consists of one or more counties (county subdivisions in New England) that demonstrate very strong economic and social ties, in addition to having close ties with the other portions of the larger MSA. When the OMB officially designates two or more PMSA's, it redesignates the MSA of which they are components as a consolidated metropolitan statistical area. The term PMSA went into effect on June 30, 1983, and represents a new type of entity for the 1990 census. The Census Bureau tabulated 1990 census data for the PMSA's in effect on January 1, 1990. Based on the results of the 1990 census, the OMB changed some PMSA designations in June 1993; the Bureau retabulated and published the 1990 census data to reflect the 1993 PMSA's. PMSA's have a four-digit FIPS code sequenced alphabetically with all other metropolitan areas. See central city, consolidated metropolitan statistical area, geographic code, metropolitan area, metropolitan statistical area, and statistical entity.

**public-use microdata area (PUMA)**—A geographic entity with a population of 100,000 or more, consisting of (1) for the 5- and 3-percent sample files, a single county or any combination of a group of counties, one or more MCD's (only in New England), one or more places, or a group of census tracts, provided that no PUMA crossed a State line, or (2) for the 1-percent sample file, one or more metropolitan areas, nonmetropolitan area, or a combination of the two (the 1-percent-sample PUMA's could cross State lines). Puerto Rico had two files (5- and 1-percent samples), and Guam and the Virgin Islands each had one 10-percent sample file. In addition, a 0.25-percent sample file covered 394 nationwide "labor market areas" defined by the U.S. Department of Agriculture. The Bureau provided unidentified individual long-form census records for these entities from the Public-Use Microdata Sample for all 50 States, the District of Columbia, Puerto Rico, Guam, and the Virgin Islands. PUMA replaced the term "county group" used in previous censuses. PUMA's were delineated by State and State-equivalent agencies and local officials on maps and/or

geocoded on diskettes containing geographic entities extracted from the TIGER data base, following guidelines prepared by the Bureau. Each PUMA is identified by the two-digit FIPS State code and a five-digit PUMA code; PUMA's that cross State lines use a State code of 99. The first three digits of a PUMA code identify the entity represented by the PUMA('s). For PUMA's based on census tracts, the last two digits identify the individual PUMA; PUMA's not based on census tracts end in "00." See statistical entity.

**region**—A grouping of States and the District of Columbia, established by the Census Bureau for the presentation of census data. The Census Bureau has defined four regions: Northeast, South, Midwest, and West. The regions are subdivided into nine divisions consisting of four to nine contiguous States, plus Alaska and Hawaii (see map in app. 3B). The four regions were designed to represent areas that were relatively homogeneous physiographically, historically, economically, and demographically when the Bureau first established them; three regions were defined in 1910, and the only major changes over the decades were the splitting of the North Region into the Northeast and North Central (renamed Midwest in 1984) Regions prior to the 1950 census, and the addition of Alaska and Hawaii to the West Region in 1960 following their attainment of statehood. The Bureau's definitions provide the basis for the presentation of a consistent continuum of census data over the decades, but there is nothing "official" about these geographic entities; data users have defined numerous other regional breakdowns of the United States, generally based on various combinations of States and/or counties. Each region has a one-digit Census Bureau code. See division, geographic code, and statistical entity.

**rural**—All population, housing, and territory that is not classified as urban by the Census Bureau. See extended city, urban, and urbanized area.

**school district**—The territory administered by the elected or appointed authorities of a State, county, or other local governmental unit to provide educational services for its residents. Most school districts include more than one school attendance area—the area within which students are assigned to a specific public school. The Census Bureau tabulated decennial census data, on a cost-reimbursable basis, for four types of school districts: elementary, middle, secondary, and unified. The Census Bureau first provided data tabulations for school districts from the 1970 census. Each school district has a five-digit Census Bureau code that is unique within State. See administrative entity, governmental unit, and legal entity.

**State, State equivalent**—A governmental unit that is the primary legal subdivision of the United States. For purposes of data presentation, the Bureau treats the District of Columbia as if it were a State. The 50 States and the District of Columbia constitute the United States. In addition, the Bureau treated six outlying areas—American

Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Republic of Palau, Puerto Rico, and the Virgin Islands of the United States—as the statistical equivalents of States for the 1990 census. The Census Bureau also published 1990 census population counts (but no demographic characteristics) for several small islands in the Caribbean Sea and the Pacific Ocean. Each State and statistically equivalent entity has a two-digit FIPS code, with the States and the District of Columbia sequenced alphabetically followed by the outlying areas in alphabetical sequence. The U.S. Postal Service has assigned each of these entities a two-character alphabetic code. In addition, the Census Bureau assigned its own set of two-digit codes to States and the District of Columbia so that it could sequence these entities geographically within each region and division. (Note that the Bureau treated the entities called “states” in Palau as county equivalents.) See geographic code, governmental unit, legal entity, and outlying area.

**statistical entity**—A geographic entity that is not legally established, but instead is defined, identified, and delineated (usually following published guidelines) specifically for the presentation of data. Statistical entities that the Bureau recognized for the 1990 census include regions and divisions, metropolitan areas (designated by the Office of Management and Budget), urbanized areas, tribal jurisdiction statistical areas, tribal designated statistical areas, Alaska Native village statistical areas, census areas and census subareas in Alaska, census county divisions, unorganized territories, public-use microdata areas, traffic analysis zones, census tracts, block numbering areas, block groups, and blocks. Statistical entities have no governmental standing, and their boundaries have no legal basis. See governmental unit and legal entity.

**sub-MCD**—A legal division of a minor civil division (MCD), reported only in Puerto Rico for the 1990 census. The Census Bureau recognized sub-MCD's called subbarrios as the legally defined administrative subdivisions of 1 or more MCD's—a barrio-pueblo or barrio—in 23 municipios (county equivalents). The 1980 census also provided data for sub-MCD's in the Trust Territory of the Pacific Islands, which the Census Bureau did not include in the 1990 census; the geographic structure of the two portions of the Trust Territory that the Bureau included in the 1990 census, the Northern Mariana Islands and Palau, no longer had sub-MCD's. Sub-MCD's have a five-digit FIPS code sequenced alphabetically within Puerto Rico and a two-digit Census Bureau code sequenced alphabetically within MCD. See geographic code, legal entity, and minor civil division.

**tabulation block**—A census collection block, or each portion of a collection block that was split by the boundary of one or more higher-level geographic entities (such as an incorporated place or a minor civil division) into two or more separately identified parts, for which the Census Bureau

tabulated 1990 census data. For split collection blocks, the Census Bureau added an alphabetic suffix to the collection block number to identify each piece of the split block; the area covered by each suffixed block number constituted a separate tabulation block. Earlier decennial censuses did not uniquely identify these portions of split blocks. See census block, census block number, collection block, tabulation geography.

**tabulation geography**—The geographic entities for which the Census Bureau tabulates and presents data. See collection geography, geographic entity, and tabulation block.

**tape address register (TAR) area**—For the 1970, 1980, and 1990 decennial censuses, the area covered by a computerized list of residential addresses created from a commercial mailing list, a post office check of that list, and a field canvass of residential addresses by census enumerators. The extent of this file was limited to the areas covered by address coding guides for the 1970 census, GBF/DIME-Files for the 1980 census, and address ranges in the TIGER data base for the 1990 census, in combination with the extent of (1) postal delivery service, by letter carriers classified by the U.S. Postal Service as “city carriers,” to structure-number/street-name addresses and (2) the commercial mailing list. See GBF/DIME-File.

**TIGER**—The acronym for Topologically Integrated Geographic Encoding and Referencing (data base, File, System).

**TIGER data base or TIGER File**—A computer file that contains geographic information representing (1) the position of roads, rivers, railroads, and other map features, together with the attributes associated with each feature, such as its name, address ranges and ZIP Codes, classification codes, and so forth; and (2) the position of the boundaries of the geographic entities that the Census Bureau uses in its data collection, processing, and tabulation operations, together with the attributes associated with those entities, such as their names and codes. The file is stored in multiple partitions, primarily individual counties and county equivalents, although it represents a single, seamless geographic-data inventory of the entire United States and the outlying areas. See address coding guide, GBF/DIME-File, and TIGER System.

**TIGER System**—The TIGER data base plus the specifications, procedures, computer programs, and related source (input) materials required to build and use it. The system also includes the specifications, procedures, computer programs, and so forth, for using the TIGER data base to perform geographic coding, produce maps, and generate tabulation control files. See TIGER data base.

**topology**—The relationship between geometric forms that remains consistent despite spatial deformation. More specifically, a branch of geometrical mathematics concerned with how points and lines on a map relate to one another to define polygons.



**traffic analysis zone (TAZ)**—A geographic entity delineated by local officials for tabulating transportation-related statistics from the decennial census under a cost-reimbursable program called the Census Transportation Planning Package—formerly called the Urban Transportation Planning Package. A TAZ usually comprised a group of blocks, a census tract, or a group of census tracts, but in a few instances was as small as a single census block that contained many workers or as large as a county. Each TAZ has a locally assigned six-character alphanumeric code that is unique within the area in which the participating agency delineated TAZ's. A total of 259 areas participated in this program for the 1990 census. See statistical entity.

**tribal designated statistical area (TDSA)**—A statistical entity, identified and delineated for the 1990 decennial census by American Indian tribal officials outside of Oklahoma, for a tribe that did not have an officially recognized land base. The Census Bureau recommended that a TDSA encompass the area that generally contained the American Indian population for which (1) a federally recognized tribe claimed to have jurisdiction or (2) a State tribe provided benefits and services to its members. A TDSA could not overlap with a Federal or State reservation or American Indian trust land, nor could it cross a State line; furthermore, its boundary had to coincide with census block boundaries. A TDSA may include a substantial number of people who are not American Indians. TDSA's have a five-digit FIPS code sequenced alphabetically within State; the Bureau also assigned its own alphabetically sequenced set of four-digit codes to TDSA's to facilitate displaying them in a single list that separately presented other American Indian and Alaska Native entities as well. See geographic code, statistical entity, and tribal jurisdiction statistical area.

**tribal jurisdiction statistical area (TJSA)**—A statistical entity, identified and delineated for the 1990 decennial census by American Indian tribal officials in Oklahoma, for one or more tribes that did not have an officially recognized land base. The Census Bureau recommended that a TJSA encompass the area that contained the American Indian population over which the tribe had jurisdiction. TJSA's replaced the "Historic Areas of Oklahoma" that the Census Bureau recognized for the 1980 census; the Historic Areas comprised the total territory (outside of urbanized areas) included in the former American Indian reservations that once had legally established boundaries but were dissolved immediately preceding the establishment of Oklahoma as a State in 1907. TJSA's could not overlap an American Indian reservation, but they could overlap one another; the Bureau treated each of two small "joint use areas" as a separate TJSA. The boundary of a TJSA had to coincide with census block boundaries. A TDSA may include a substantial number of people who are not American Indians. TJSA's have a five-digit FIPS code sequenced alphabetically within Oklahoma; the Bureau also assigned its own alphabetically sequenced set of four-digit codes to

TJSA's to facilitate displaying them in a single list that separately presented other American Indian and Alaska Native entities as well. See geographic code, statistical entity, and tribal designated statistical area.

**unorganized territory (UT)**—In a State with minor civil divisions (MCD's), the portion of one or more counties that have territory that is not within a legally defined MCD. The Bureau delineated one or more UT's as the statistical equivalents of MCD's in such areas. The nine States with UT's for the 1990 census were Arkansas, Iowa, Kansas, Louisiana, Maine, Minnesota, North Carolina, North Dakota, and South Dakota. See county subdivision, minor civil division, and statistical entity.

**urban**—All population, housing, and territory within urbanized areas (UA's) and the urban portion of places outside UA's that had a decennial census population of at least 2,500. The Census Bureau classified as **rural** all population, housing, and territory that was not urban. See extended city, place, and urbanized area.

**urbanized area (UA)**—An area consisting of one or more places and adjacent densely settled territory (the urban fringe) that together had a minimum census population of at least 50,000 people and generally had an overall population density of at least 1,000 people per square mile of land area. In addition to the contiguous territory with a population density of at least 1,000 people per square mile, the urban fringe also could include noncontiguous territory with that density if it was connected to the contiguous area by road and was within 1.5 road miles of that area, or within 5 road miles but separated by water or other undevelopable territory. Other territory with a lower population density could be included in the urban fringe if it eliminated an enclave or closed a significant indentation in the boundary of the UA. The Census Bureau used published criteria to delineate the boundaries and determine the qualification of UA's. UA's have a four-digit Census Bureau code sequenced alphabetically; a UA representing the urban core of a metropolitan area (MA) with essentially the same name may use the same code for the MA and the UA. See central place, extended city, statistical entity, and urban.

**user-defined area (UDA)**—An area delineated by a data user so that the Census Bureau could provide specified 1990 census data tabulations for it. Such areas were identified by 129 participants for the Bureau's cost-reimbursable User-Defined Areas Program. The participant either geocoded an extract file of geographic entities provided by the Bureau or annotated the desired boundaries on a 1990 census block-numbered map.

**voting district**—Any of a variety of legally defined entities, including election districts, precincts, legislative districts, and wards, established by States and local governments for election purposes. Because voting districts had to follow 1990 census block boundaries even if some districts did

not actually coincide with such features, the voting districts shown in the 1990 census data and on the 1990 census maps may only approximate the actual districts; the States were asked to identify the real and the approximated voting districts, and the Bureau flagged the real ones in the TIGER data base and the data products as well as on the census maps. Voting districts are identified by a locally assigned four-character code—all numeric, all-alphabetic, or mixed alphanumeric—that is unique within county. For the 1980 census, voting districts were referred to as election precincts. See administrative entity and legal entity.

**ZIP Code**—An administrative entity established by the United States Postal Service (USPS) for the distribution of mail. A ZIP Code is a 5-, 7-, 9-, or 11-digit code assigned by the USPS to a section of a street, a group of streets, or an establishment, structure, or group of post office boxes for the most efficient delivery of mail. Therefore, ZIP Codes

typically do not coincide with the boundaries of the legal or statistical entities for which the Census Bureau tabulated 1990 census data, including State and census block boundaries. Because the Census Bureau tabulated data for five-digit ZIP Codes based on a purchased file that equated residential ZIP Codes to groupings of whole 1990 census blocks, the 1990 census data may only approximate the area actually served by a specific ZIP Code. See administrative entity and legal entity.

**zona urbana (ZU)**—A type of census designated place in Puerto Rico delineated by Commonwealth officials to encompass the municipio (county equivalent) seat of government and any adjacent built-up area. ZU's were delineated using the same guidelines used for comunidades, except that ZU's (1) had no minimum population threshold for qualification and (2) could not cross municipio boundaries. See census designated place, comunidad, and statistical entity.



## APPENDIX 3B.

# Examples of 1990 Census Maps

The following pages contain samples of the various map types produced for the 1990 census. These maps include those produced on the relatively low resolution/high speed "electrostatic plotters" and the "publication" maps that were produced from printer negatives for the published reports.

### Electrostatic Maps

**1990 County Locator Map** is a medium-scale outline map used primarily by the District Offices (DO's) for planning, orientation, recruiting, and managing enumerator assignment assignments. Map coverage includes all territory in each county. State, county, DO, AI/ANA, and ARA boundaries are shown. MCD's, incorporated places, and ANVSA's are identified by name only. All cartographic base features coincident with displayed boundaries are shown and major noncoincident features, such as roads and streams, are displayed. Cross-reference listing identifying the ARA numbers on a map sheet and the map sheets associated with a specific ARA number are provided with the map for reference.

**1990 Address Register Area (ARA) Map** is a large-scale map produced for each ARA. Collectively, the groups for the four types of 1990 census enumeration cover the entire United States and its possessions: 1988 prelist, precavass (TAR), 1989 prelist (update/leave), and list/enumerate. A limited number of geographic entity boundaries, including State, county, AI/ANA, and ARA are shown. Areal features such as water bodies; linear features such as roads, railroads, pipelines, power transmission lines, and single-line hydrography; and landmark features such as mountain peaks, parks, and schools are displayed and names. Census block numbers are displayed. Listings identifying all streets and their associated ARA's within district offices may be used as a cross-reference to ARA Map sheets.

**1990 County Block Map** is a comprehensive, multi-sheet, county-based reference map series. The maps portray and identify most geographic entities for which the Census Bureau tabulates data and a wide range of cartographic base features. Census block numbers are shown. An index to map sheets is provided for each county.

**1990 Census Tract/Block Numbering Area Outline Map** is a full-size (36" x 42"), county-based map series. Identifies MCD/CCD's, incorporated places/CDP's, AI/ANA's, and CT/BNA's. Only those cartographic base features coincident with CT/BNA boundaries are identified.

### Publication Maps

**1990 State/County Outline Map** is a page-size, state-based map series showing State and county boundaries and names. State capitals and selected places are included.

**State/Metropolitan Area Outline Map** is a page-size, State-based map series showing State, county, and metropolitan area boundaries and names. The three types of metropolitan areas—MSA's, CMSA's, and PMSA's—are distinguished. State capitals and selected places are included.

**1990 County Subdivision Outline Map** is a State-based map series, produced as a multi-sheet, page-size map series. Identifies counties, MCD/CCD's, incorporated places/CDP's, and AI/ANA's. An index to the map sheets is provided for each State.

**1990 Urbanized Area Outline Map** is a page-size, UA-based map series. State, county, MCD/CCD, incorporated place/CDP, and AI/ANA boundaries and names are shown in addition to the extent of the subject UA.

**Regions and Divisions of the United States** is a page-size map of the United States showing State, region, and division boundaries and names.

Figure 1. 1990 County Locator Map

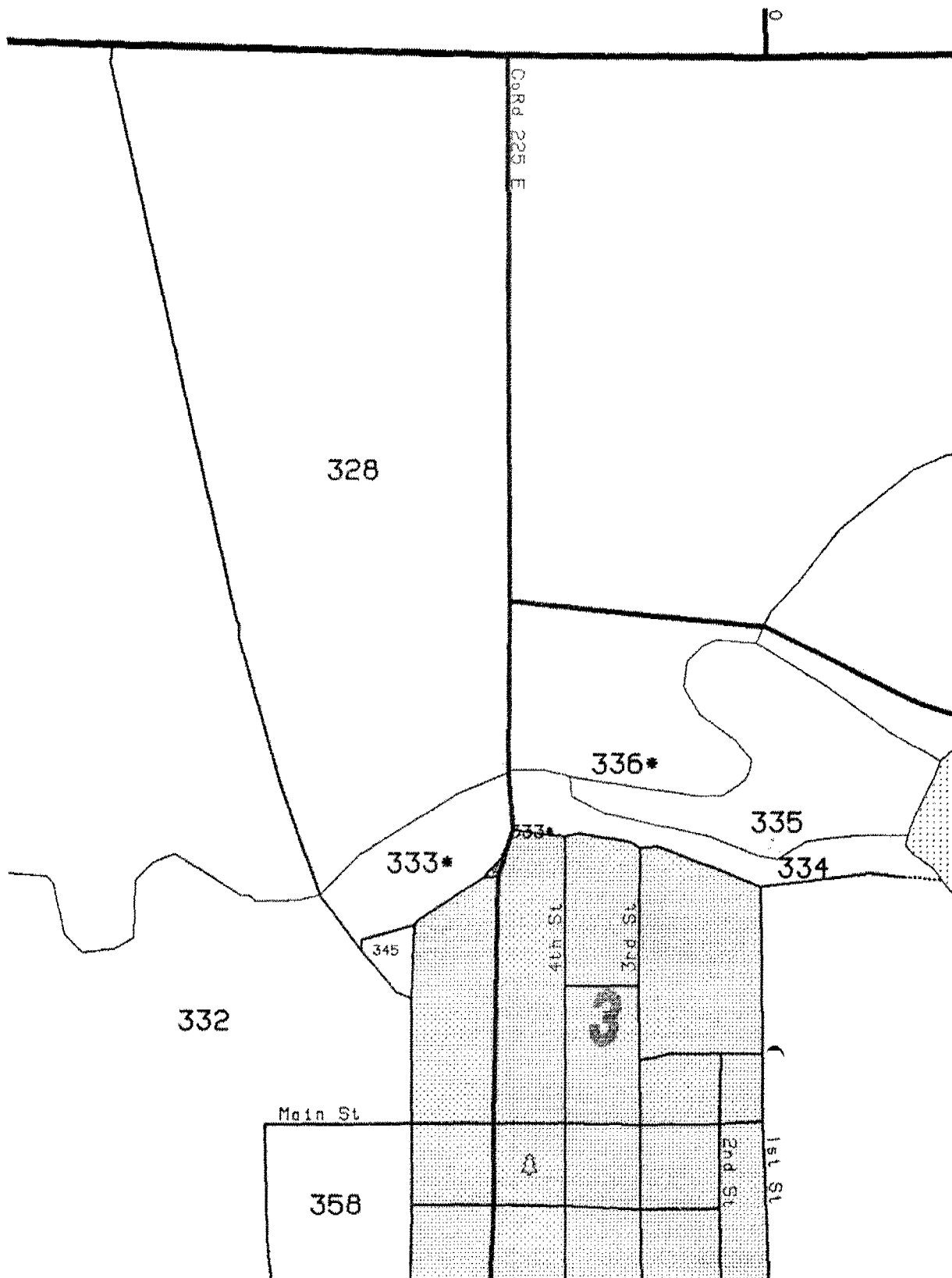


Figure 2. 1990 Address Register Area Map

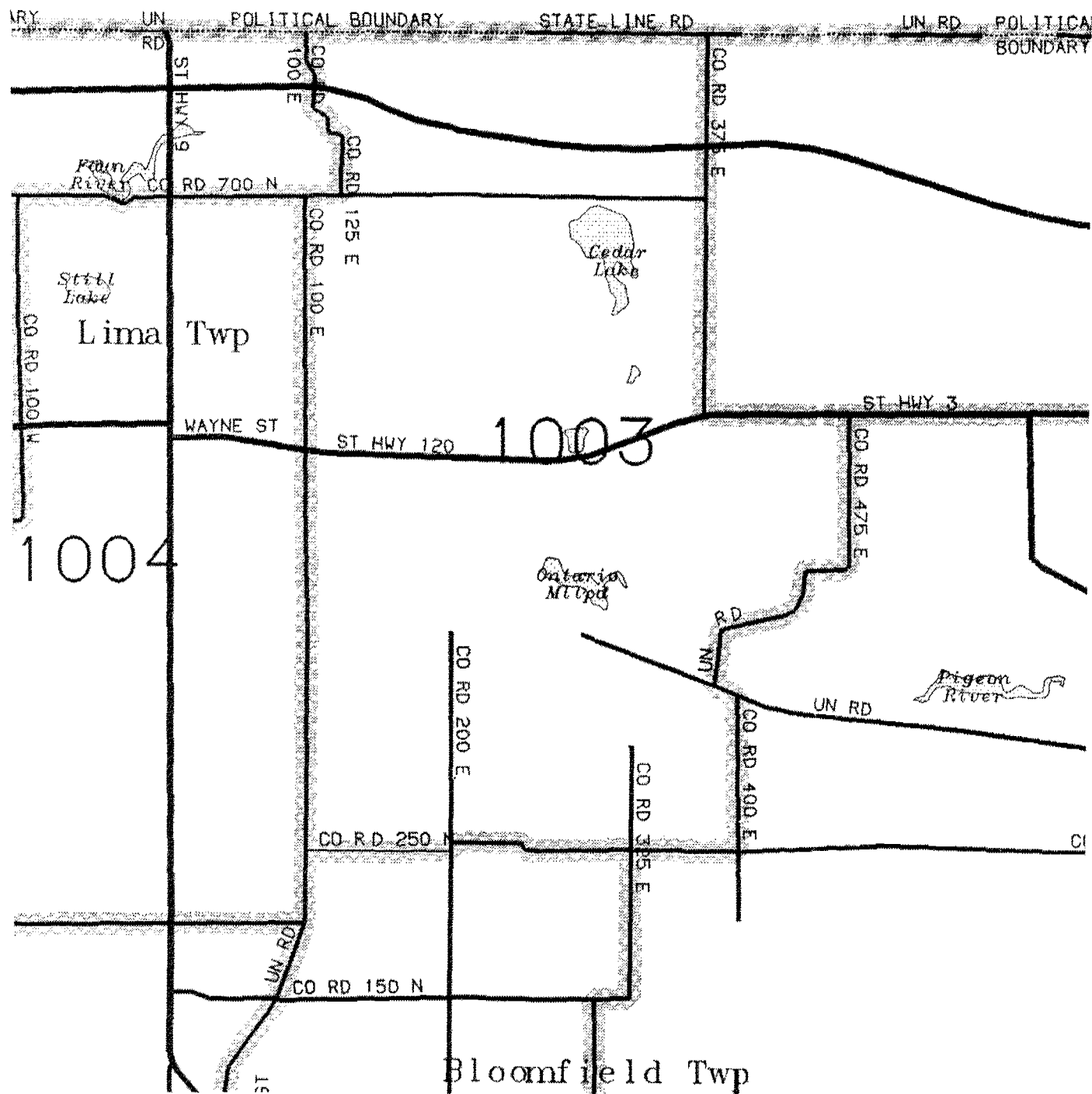


Figure 3. 1990 County Block Map

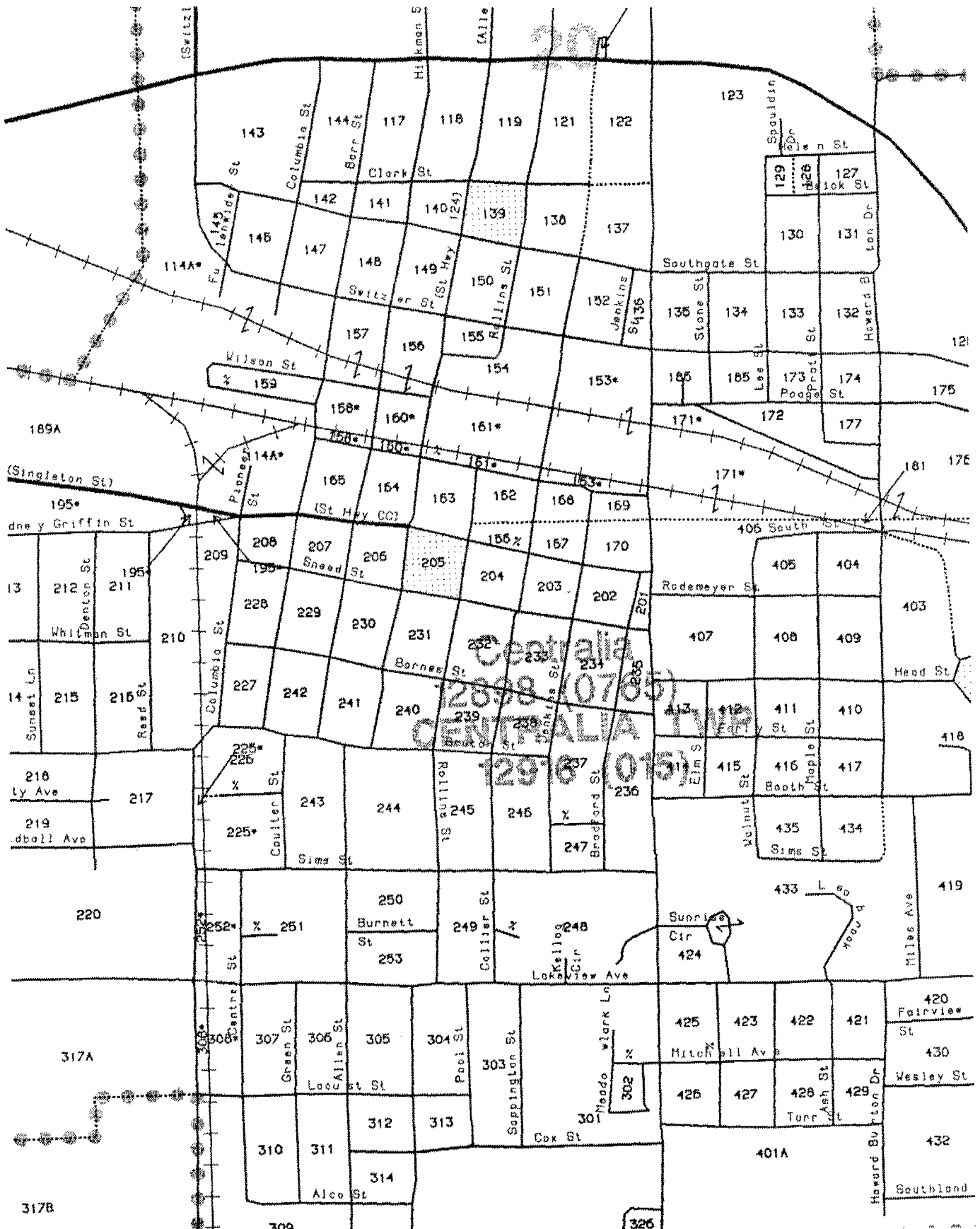


Figure 4. 1990 Census Tract/Block Numbering Area Outline Map

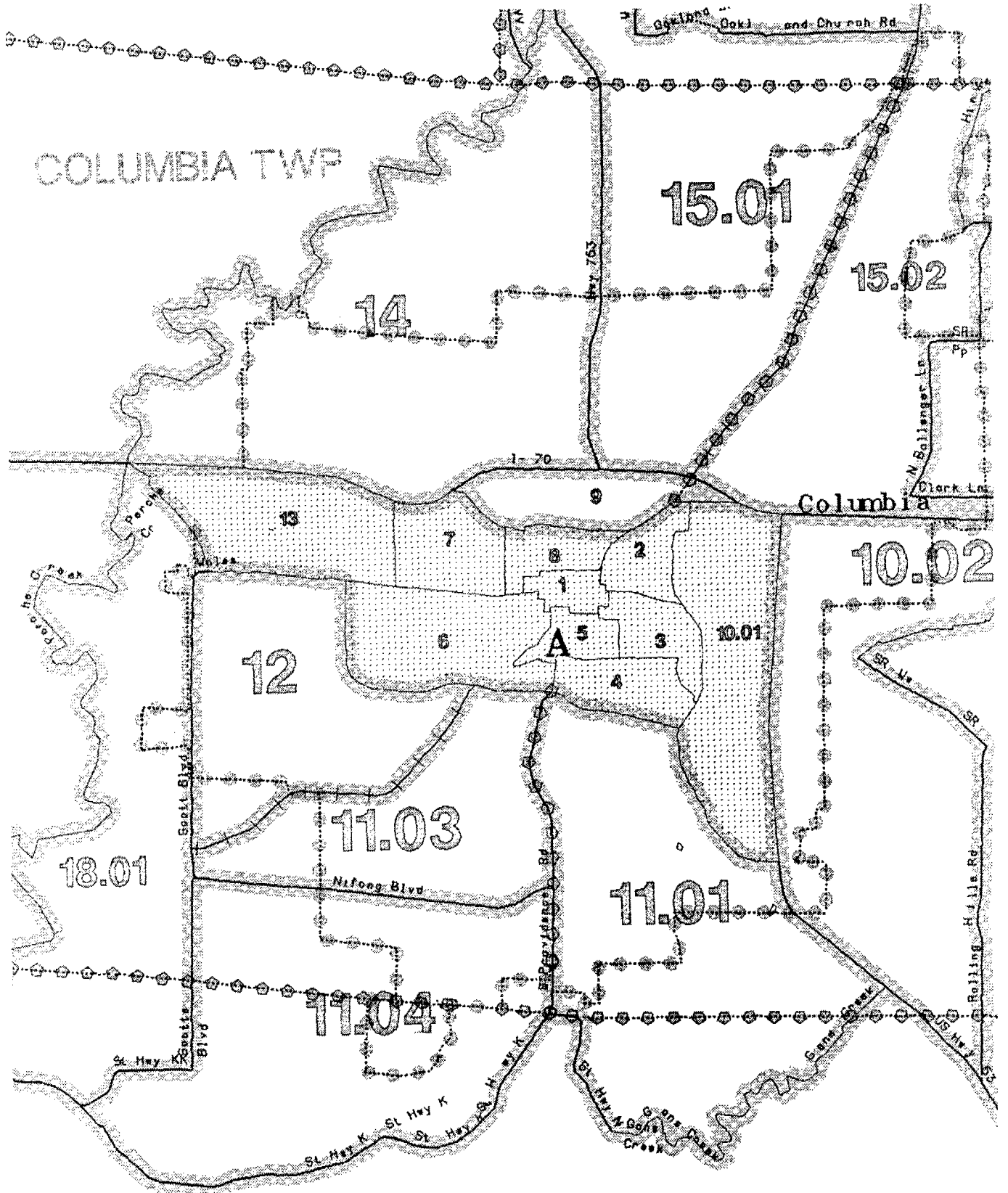
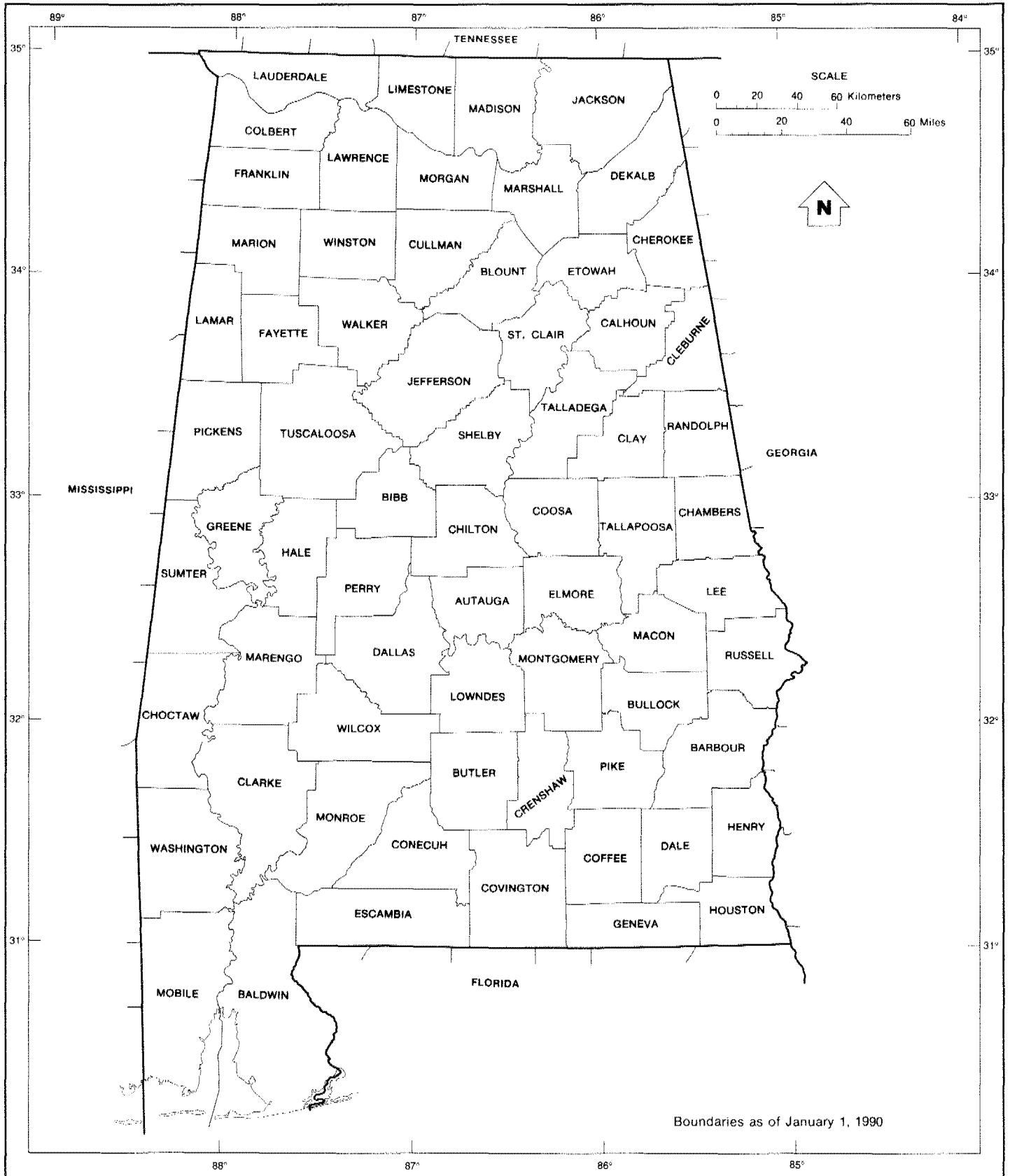


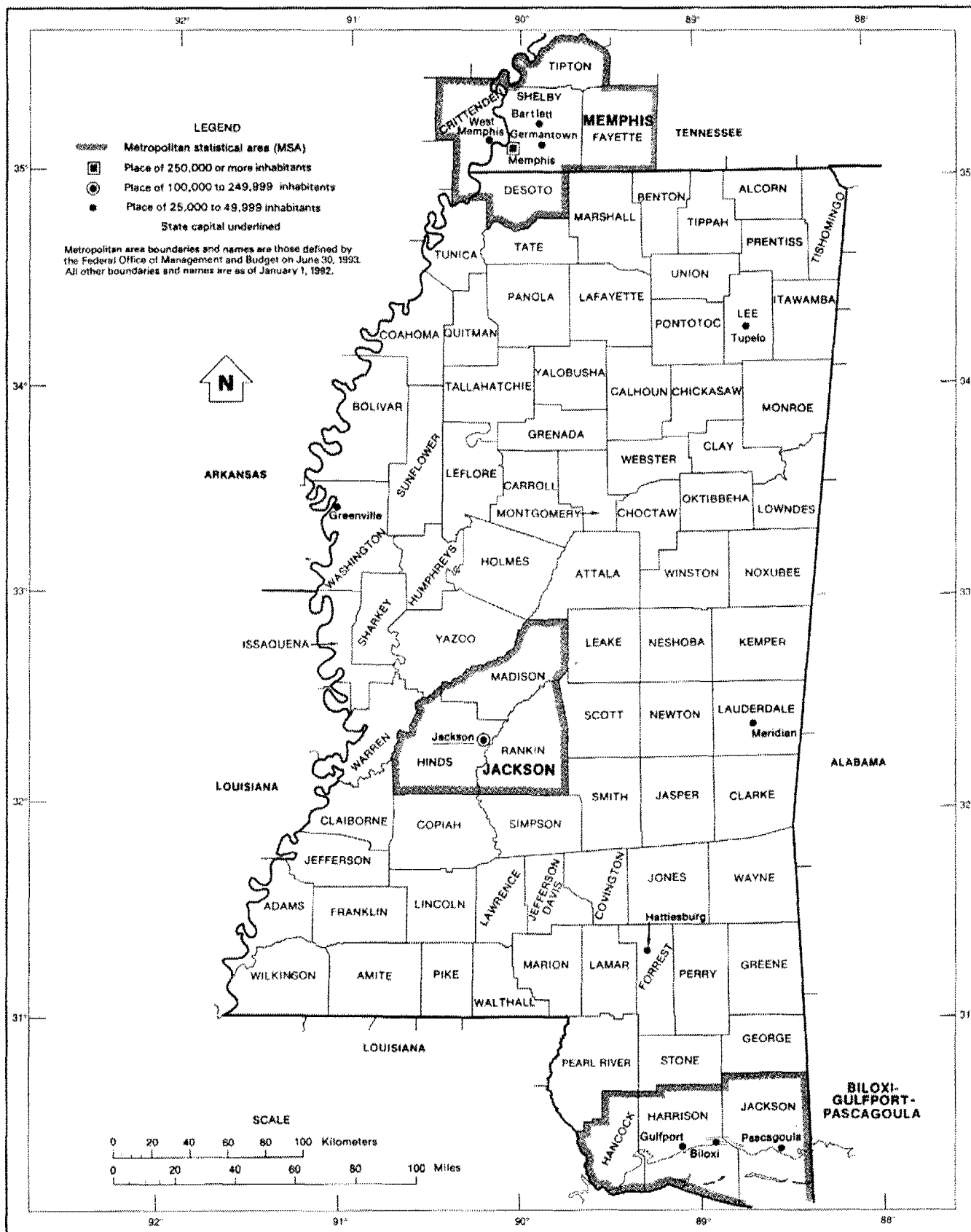
Figure 5. 1990 State/County Outline Map



U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration Bureau of the Census

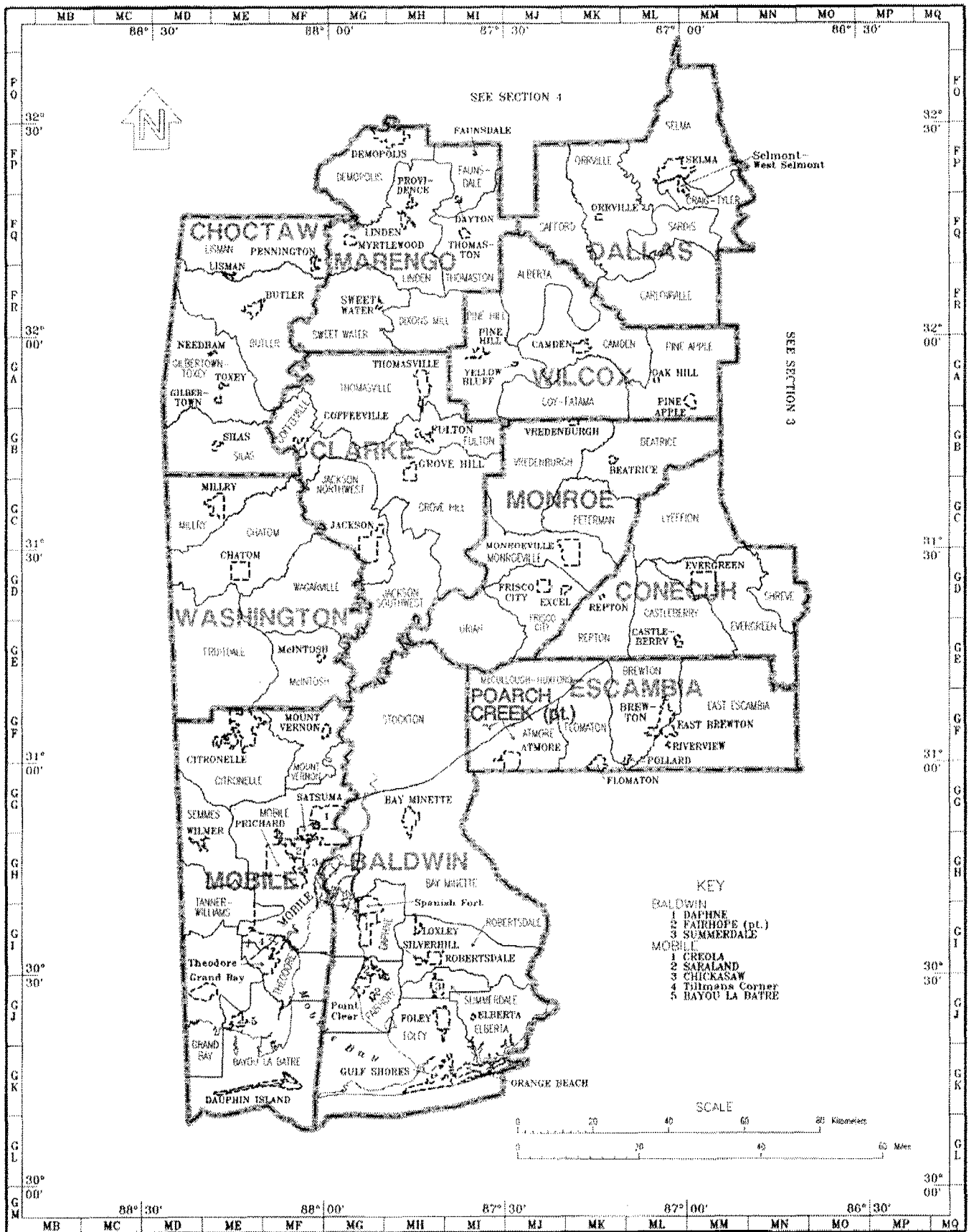


Figure 6. State/Metropolitan Area Outline Map



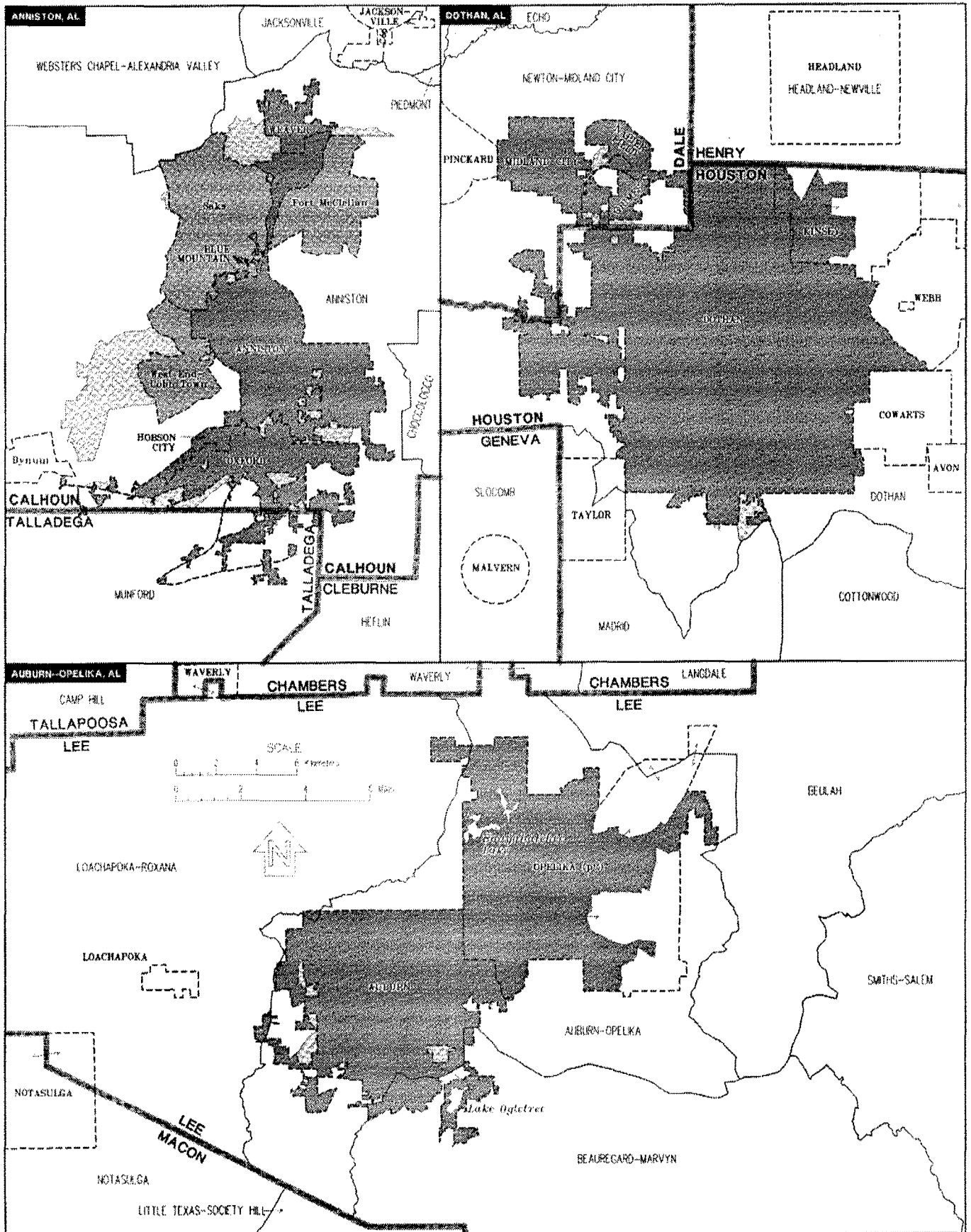
U.S. DEPARTMENT OF COMMERCE: Economics and Statistics Administration Bureau of the Census

Figure 7. 1990 County Subdivision Outline Map



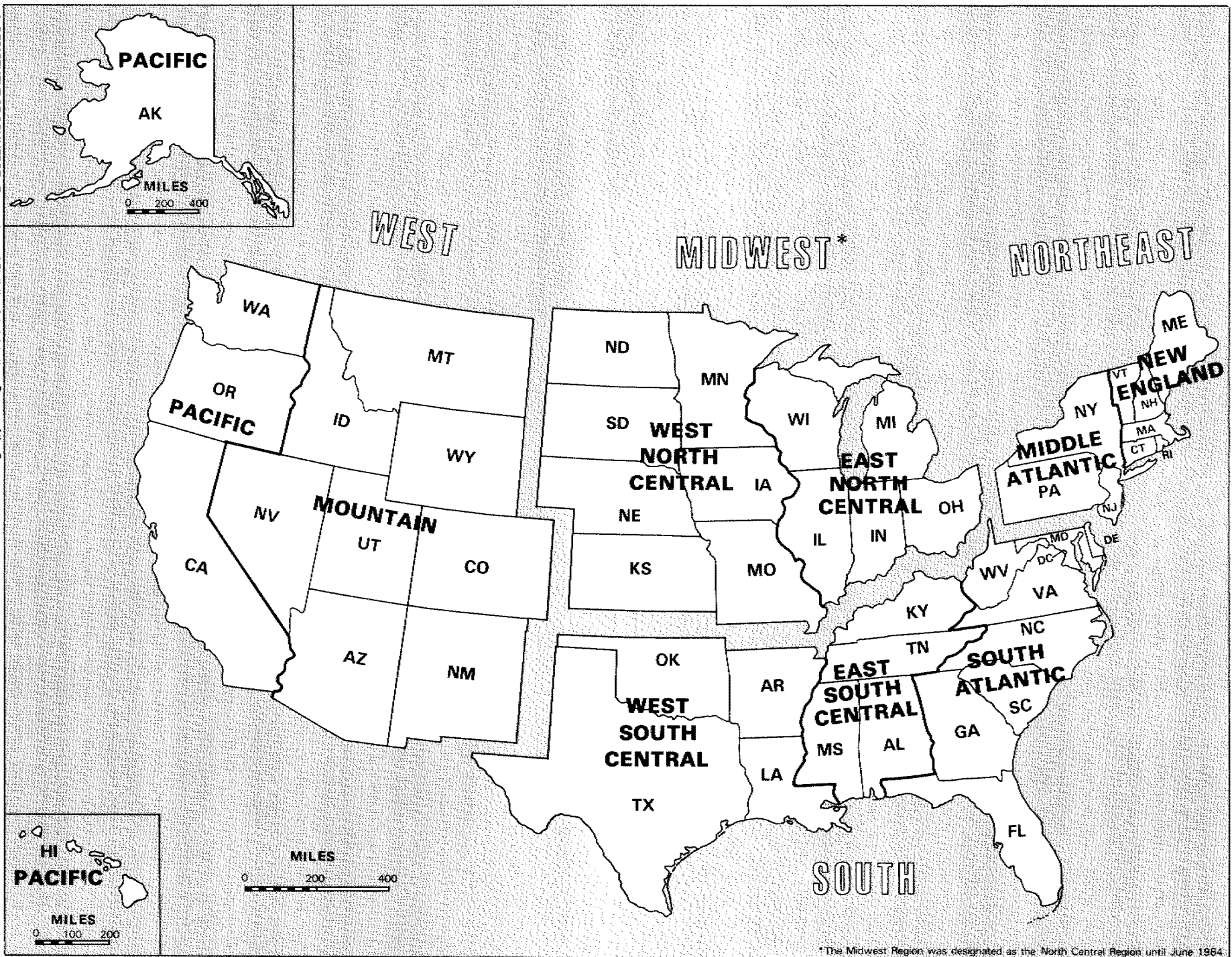
U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration Bureau of the Census

Figure 8. 1990 Urbanized Area Outline Map



U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration Bureau of the Census

Figure 9. Regions and Divisions of the United States



\*The Midwest Region was designated as the North Central Region until June 1964.

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# SELECTED ABBREVIATIONS AND ACRONYMS USED IN CENSUS OPERATIONS

|        |   |       |  |
|--------|---|-------|--|
| ACF    | address control file                                  | ID    | identification number  |
| ACR    | advance census report                                 | IDF   | identification number file   |
| AL     | advance listing                                       | IFB   | invitation for bids  |
| APOC   | advance post office check                             | L/E   | list/enumerate   |
| ARA    | address register area                                 | MDO   | master district office   |
| BHR    | block header record                                   | MO/MB | mailout/mailback   |
| BNA    | block numbering area                                  | OGC   | Office of the General Counsel  |
| BSA    | basic street address                                  | OMB   | Office of Management and Budget  |
| CAC    | census address check                                  | OSDBU | Office of Small and Disadvantaged<br>Business Utilization                |
| CCS    | collection control system                             | PO    | processing office  |
| CEN    | Census [Bureau]                                       | PRO   | Procurement Office   |
| DO     | district office                                       | QA    | quality assurance  |
| DOC    | Department of Commerce                                | RCC   | regional census center   |
| DOD    | Decennial Operations Division                         | RFP   | request for proposal   |
| DPD    | Data Preparation Division                             | RMIS  | rail management information system                                       |
| DPLD   | Decennial Planning Division                           | STSD  | Statistical Support Division   |
| FLD    | Field Division  | TAR   | tape address register  |
| FOS    | field operations supervisor                           | TIGER | Topologically Integrated Geographic<br>Encoding and Referencing (system) |
| FOSDIC | film optical sensing device for input to<br>computers | U/L   | update/leave   |
| GEO    | Geography Division                                    | USPS  | United States Postal Service   |
| GPO    | Government Printing Office                            | ZIP   | zone improvement program   |
| GUS    | geographic update system                              |       |  |
| HQ     | Headquarters (Suitland, MD)                           |       |  |



# CHAPTER 4.

## Addresses and Questionnaire Printing

### ADDRESSES

#### Introduction

The plan for the 1990 census was to enumerate approximately 95 percent of the United States population by mail. Instructions printed on the pre-addressed mailback questionnaires asked respondents to complete the form and return it by mail. About 90 percent of these questionnaires were delivered by the United States Postal Service (USPS), while 10 percent were delivered in some rural and seasonal housing areas by census enumerators using update/leave procedures. In very sparsely populated rural areas, where the remaining 5 percent of the population lived and where it was not cost-effective to develop address lists in advance, postal carriers left unaddressed questionnaires at all delivery boxes. Respondents were instructed to complete and hold these forms for pickup by an enumerator. (See ch. 6.)

Accurate and complete address lists are the foundation of the mail census methodology. The Bureau created the master address file from these address lists so it could mail questionnaires, control the enumeration, monitor the mail returns to determine whether a questionnaire had been returned, and code each address to its correct census geography.

Further, the mailout/mailback method of enumeration required a comprehensive file of addresses that the USPS could use for mail delivery. The Bureau used two methods for compiling the master file. First, it purchased residential address lists for predominately urban mail delivery areas, for which it had computer files that enabled it to assign geographic codes to most of the addresses. Second, it sent enumerators into the field to compile address lists and assign the addresses to geographic codes in small cities, suburban areas, and rural delivery areas where mailing addresses usually had house numbers and street names. These were referred to as tape address register (TAR) areas and prelist areas, respectively.

The following sections (1) detail the actions and operations to acquire, correct, and format these addresses into a usable address file, and (2) show costs where these can be identified separately.

#### ADDRESS LIST COMPILATION IN TAPE ADDRESS REGISTER (TAR) AREAS

Based on the 1984 Address List Compilation Test (see ch. 2), the Bureau determined that commercial vendor address files would be the basic address source in TAR

areas for the 1990 census. Of the 449 stateside district offices (DO's), 423 had one or more TAR areas within their boundaries.

An urban area was designated as a TAR area if it met certain requirements: (1) The Bureau had to have a computerized geographic coding file for the area, (2) a computerized residential address list was available from a vendor, and (3) the area received city delivery service from the USPS. A TAR address consisted of a house number (and/or suffix), street name, apartment unit designator (if multiunit), post office name, State abbreviation, and ZIP Code. Acquiring TAR area addresses through vendors was a low-cost and efficient way of obtaining addresses for urban areas.

#### Address List Acquisition

To establish the TAR address file, the Bureau purchased residential address files from commercial vendors through a competitive procurement process. The units involved in planning and implementing this acquisition were the Decennial Planning (DPLD), Decennial Operations (DOD), Geography (GEO), Statistical Support (STSD), and Data Preparation (DPD) Divisions, and the Procurement Office (PRO).

DPLD prepared the required Procurement Request (Form CD-435) showing the estimated dollar amount of the procurement, management approval signatures, a commitment of funds in the estimated amount of the procurement, and other required information. The additional information included a preliminary list provided by GEO of the TAR ZIP Codes contained within each bid group. This procurement package, which included the request for proposal (RFP; see below) and the procurement request, was submitted to the PRO and then to the Department of Commerce (DOC) Office of Small and Disadvantaged Business Utilization (OSDBU) for review. The OSDBU recommended to the Procurement Office's contracting officer that this be processed as full and open competition. The PRO's announcement was published in the *Commerce Business Daily*, as required for all procurements over \$10,000, on March 13, 1987.

The RFP defined the scope of the work, established address file specifications, summarized what the contractor was required to do, and stated how the Bureau planned to use the address files once purchased. The RFP was finalized, submitted to the DOC Office of the General Counsel (OCG) for review, and released to the public on April 16, 1987. Copies were mailed to 71 vendors and others who responded to the initial announcement. The closing (due) date for the RFP was May 18, 1987.

To be considered for evaluation and award, each offeror was required to submit a computer tape that identified all its postal carrier routes by ZIP Code and the number of addresses, counts in each bid group for which it wanted to be considered, a cost/price proposal, and a company profile.

Meanwhile, STSD continued work on the technical evaluation plan. This included selecting a random sample within each bid group of carrier routes where addresses would be compared to determine the coverage and quality of each offeror's list. To evaluate the bidding vendors' address lists, the Bureau provided blank computer tapes to potential vendors and asked them to submit all their addresses for a predesignated sample of carrier routes. STSD drew this sample from 1 or more of 21 predetermined bid groups that identified TAR ZIP Codes within groupings of States and/or counties. This sampling, to cover about 4.4 million addresses, used aggregations of whole States (where possible), avoided splitting contiguous TAR areas, and avoided groupings containing so few addresses that no company would bid on them. The Bureau formatted and geocoded the prospective vendors' submissions and had contractors print the addresses on cards (form D-700C; see below) for the USPS to verify. The appropriate post offices reviewed the cards and reported duplicate and undeliverable addresses for 9,012 carrier routes within 4,844 ZIP Codes. The criteria for selecting the "best" lists were based on a combination of coverage and quality, company personnel, experience, and bid cost.

After reviewing the cost data in conjunction with the technical evaluation, the PRO sent the contracts for legal review. An option was added to the contract that enabled the Bureau to buy additional addresses in each bid group. The final awards were made to two companies on February 9, 1988.

By April 6, 1988, computer tapes for all bid groups (approximately 55 million addresses) from both contractors were received. These tapes covered all city-delivery type (house number/street name) housing-unit addresses in the contract areas. (The addressing system within TAR areas was generally considered the most structured and logical, with regular block configuration.) Once acquired, GEO and other divisions reviewed, standardized, and reformatted these address files in preparation for geocoding and the first Advance Post Office Check (APOC).

After compiling and editing these address lists to identify and delete unusable addresses, the Bureau generated label tapes and sent them to a printing contractor in Southern California, where approximately 55 million addresses in 6,333 ZIP Codes were printed individually on APOC 1 Address Cards (Form D-700A; see fig. 1) in carrier route sequence. The contractor then shipped these cards to the appropriate USPS facilities for the APOC 1 operation.

#### **Advance Post Office Check (APOC 1)**

Over the course of the census, the USPS aided the Bureau in three important ways: It checked the accuracy and completeness of the address list, delivered

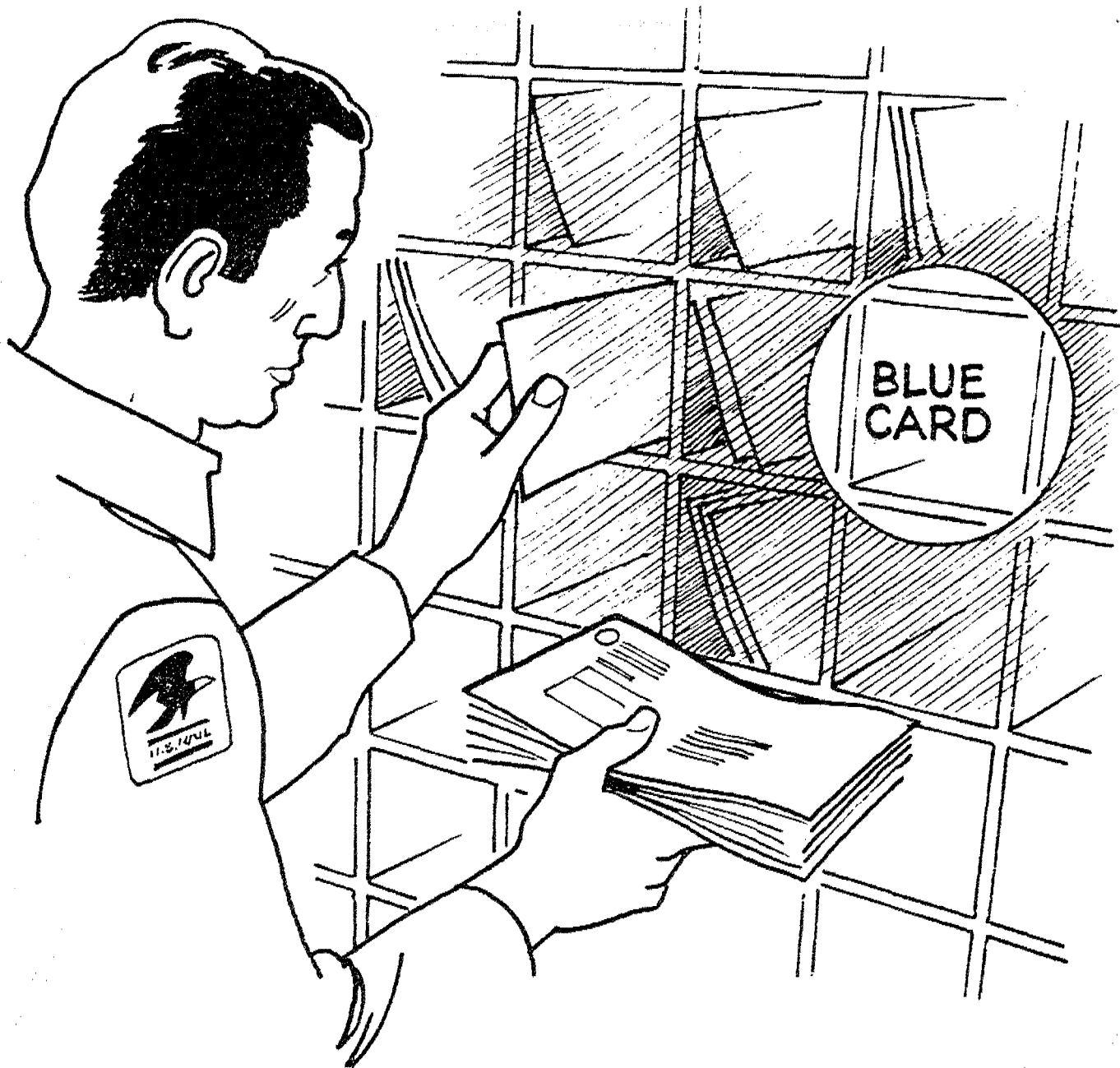
questionnaires to housing units, and returned forms to the processing and district offices. APOC 1 was an operation where USPS letter carriers verified the Bureau's residential addresses in TAR areas. The Bureau reimbursed the USPS for contractual services. The APOC 1 operation began on August 29 and ended October 14, 1988. Despite meeting the overall schedule for tape acquisition and delivery to the printer, delays occurred during the APOC 1 card printing and delivery process that resulted in the Government Printing Office (GPO) granting a 2-week extension of the printing contract. This did not have any adverse effects on processing the APOC 1 cards, or on any subsequent census operations. The major delay was caused by the printer's inability to produce a manifest mailing system for shipping the APOC 1 cards to the post offices via parcel post.

The USPS was responsible (detailed in an interagency agreement) for the development of training materials for its employees involved in APOC operations. Bureau personnel reviewed these materials prior to their use. The training program was a two-stage approach involving a train-the-trainer package as well as a carrier training program. The course administrator and the manager of training (or designee) conducted the train-the-trainer program for postal managers, who in turn trained their carriers involved in the APOC. The program contained three modules: APOC orientation (an introduction to the APOC operation and an outline of census history), carrier training (the details of the operation), and quality assurance (QA) training (instructions to postal management on how to conduct the QA check). Once training was completed, the USPS distributed the appropriate address cards to its carriers.

During the APOC, carriers verified the preprinted address information on each card, "cased" all cards that were deliverable as addressed or with corrections, and annotated corrections as required. "Casing" was a sorting process that carriers used to put their mail in delivery sequence. Generally, each housing unit on a mail route had a designated slot at the carrier's work station. The carrier set aside all cards that were undeliverable, or a duplicate of a cased card. After this, he/she reviewed the case and prepared a Post Office Report of Missing Addresses (Form D-702; see fig. 2), commonly called a "blue card" or "add card" for each residential address (single or multiunit housing units and/or special place) missing an address card. The QA program required the delivery services supervisor (or designee) to review each carrier's work.

Approximately 55 million address cards were sent to the APOC 1 operation; USPS classified 95.9 percent as "deliverable as addressed," with another 2.0 percent "deliverable with correction" and 2.1 percent as "undeliverable" or "duplicate." This operation identified about 3.3 million missing addresses, about a 3.5-percent increase to the original vendor files. The total cost for the APOC 1 operation was \$7.1 million, or about \$0.12 per address.<sup>1</sup>

<sup>1</sup>Unless stated otherwise, total cost figures for operations such as APOC 1 that appear in this *History* include both personnel compensation (e.g., wages, salaries, and benefits) and other costs (e.g., printing, supplies, rent, and utilities).



USPS employee cases APOC 1 address cards; empty slot indicates a missing address card.

The post offices sent all cards, materials, and reports from the APOC 1 operation to the DPD in Jeffersonville, IN, where corrections and adds were keyed, and the duplicate and undeliverable cards were flagged on (but not deleted from) the data file. The GEO was coding the vendor addresses concurrently during APOC 1. After APOC 1, it attempted to geocode all adds; the resulting data file was incorporated into the geocoded TAR address file.

**Geocoding addresses**—The geocoding operation's primary role in TAR areas was to geographically classify each vendor and APOC address for the 1990 census operations by linking it to a census block number and street segment

side contained within the Bureau's Topologically Integrated Geographic Encoding and Referencing (TIGER) file (see ch. 3). This linkage allowed controlling address list compilation and data collection, along with supporting the tabulation and publication programs. Products produced during the geocoding operation provided the structure for the ACF (address control file) in TAR areas. The geocoding operation lasted from March 30, 1988, until February 1989.

GEO coded the vendor addresses in two computer cycles. The staff of the FLD regional census centers (RCC's) attempted to clerically geocode and add to the

Figure 1. APOC 1 Address Card, Form D700A (Buff Card)

455 HOUSE NUMBER W 34TH ST STREET NAME  
 NEW YORK CITY NY ST  
 H8 10001 0128 UNIT DES. ZIP CR

000500014725



FORM D-700A  
(2-12-88)

**APOC ADDRESS CARD**

U.S. DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS

21st Decennial Census - 1990

00001506

The release of this information to the Census Bureau is authorized under 39CFR 266.4 (b) (2) (v).

Figure 2. Post Office Report of Missing Addresses, Form D702, (Blue/Add Card)

00143488

Card \_\_\_\_\_ of \_\_\_\_\_ cards

| 1. House No.   |                              | 2. Street name or rural route and box No. |                 |  | 3. City                      |                          |  | 4. State  | 5. ZIP Code |          |
|--|------------------------------|---|-----------------|--|------------------------------|--------------------------|--|---|-------------|----------|
| 6. Special place name or type - See instructions on back of card.                          |                              |   |                 |  |                              |                          | 8. GEO No. of nearest DELIVERABLE unit on same side of street  |   |             |          |
| 7. Unit designation - Fill (a) or (b) as appropriate for each unit at a multiunit address. |                              |   |                 |  |                              |                          | 9. Location information for rural route/box No. type addresses |   |             |          |
| Line No.   | Apartment or trailer No. (a) | Location description (b)                  | CENSUS USE ONLY | Line No.   | Apartment or trailer No. (a) | Location description (b) | CENSUS USE ONLY  | a. Householder name   |             |          |
| 1  |                              |   |                 | 7  |                              |                          |  | b. Street or road name  |             |          |
| 2  |                              |   |                 | 8  |                              |                          |  | c. Nearest intersecting street or road on each side of the housing unit |             |          |
| 3  |                              |   |                 | 9  |                              |                          |  |   |             |          |
| 4  |                              |   |                 | 10   |                              |                          |  |   |             |          |
| 5  |                              |   |                 | 11   |                              |                          |  |   |             |          |
| 6  |                              |   |                 | 12   |                              |                          |  |   |             |          |
| FORM D-702 (2-29-88)   |                              |   |                 | U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS |                              |                          |  | CENSUS USE ONLY   |             |          |
| POST OFFICE REPORT OF MISSING ADDRESSES<br>21st Decennial Census - 1990                    |                              |   |                 | DO   |                              | ARA                      |  | Block   |             | Map spot |
|  |                              |   |                 | CIRCLE ONE: NF MD MU A OR SA OS                  |                              |                          |  |   |             |          |

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TIGER file information that permitted coding any addresses that did not machine-code during the first cycle. GEO matched the vendor address file to address ranges in extracts from the TIGER file and assigned the matched addresses to their respective collection geography—the DO, address register area (ARA), and census block numbers.

The first geocoding cycle identified missing or incomplete address information in the TIGER file extract. The goal of the clerical resolution (following the first cycle of machine geocoding) was to increase the success rate of the second cycle of machine coding. The geocodes assigned by the RCC staffs served as a backup if the vendor addresses could not be coded in the second cycle. The geocoding rate was about 99 percent. While assigning collection geography, the computer assigned walking-sequence numbers for all matching housing-unit and special-place addresses. Beginning at the northwesternmost corner of each block, these numbers chained addresses in a clockwise rotation around the block. This feature allowed DOD to sort the address list in an orderly route for enumerators to follow for the prec canvass operation (see below).

The Decennial Planning Division (DPLD) compiled an inventory of nonresidential units (called "special places") from administrative records of government and private sources. Special place addresses also went through the first-cycle machine coding, clerical resolution, and the second-cycle machine geocoding. The TAR geocoding workload included approximately 96,000 special-place addresses.

GEO attempted to geocode address adds to the vendor file from the APOC operation using a TIGER file geocoding extract containing updates from clerical resolution. The RCC's did not try to clerically resolve uncoded APOC adds due to the limited amount of time between receipt of the keyed addresses and the date for delivering the final geocoded address file to DOD (in order to prepare the prec canvass files).

GEO edited and delivered all address files to DOD after the second machine geocoding. Each delivered file contained a record for each address that went through TAR geocoding. Uncoded records contained blank DO, ARA, census block, and walking-sequence fields.

This address file was then structured (split up) into TAR ACF's (see p. 13)—one for each district office (DO) that contained one or more TAR areas. Within each ACF, the coded addresses were sorted by ARA, and by block within each ARA. Addresses that GEO could not code (yellow card addresses) were filed for later reconciliation during the yellow card coding operation (see ch. 6 and p. 16).

### **Precanvass Operation**

To verify the accuracy and completeness of the vendor address list in TAR areas after it had been updated through the APOC operation and geocoded by GEO, enumerators "prec canvassed," i.e., they canvassed assigned blocks and

visited addresses, and made address corrections, additions, and deletions in the registers. DOD gave FLD the files to print the address registers needed for the operation, and the RCC's furnished the appropriate census maps.

Precanvass occurred approximately 6 to 10 months before peak census operations. To meet field requirements for these major operations and to avoid substantial costs of opening all DO's for this period, FLD grouped the 449 DO's nationwide into 109 consolidated DO areas. Within each, one DO was designated as the master district office (MDO). These MDO's opened in March 1989 and directly managed the early census activities. (Information on DO organization and staffing can be found in chapter 6.) Approximately 55 million housing units were canvassed during the precanvass operation, which began on May 15, 1989, and lasted until the end of June. Approximately 6 million adds were made during this operation.

The TAR ACF's were structured into precanvass assignments, grouped into master district office (MDO) areas, and copied onto tape cartridges (called TK-70's) along with programs to produce print copies of the files in address register format. The TK-70's were sent to the MDO's where precanvass address registers were printed and assembled.

Using source files from DOD, each MDO printed the address listing pages (form D-102A; see fig. 3) in DO/ARA/block number order and in walking sequence within each block. These address listing pages were then assembled into address registers for the enumerators. DOD also supplied special-place files that the MDO's used to print the special-place address listings, which they incorporated into the appropriate registers. DOD also provided MDO's with files to print control listings such as the ARA directory (form D-325), which was used for staffing projections, work organization, and assigning work to individual enumerators.

Field staff was trained using the pyramidal approach (i.e., where trainees become trainers; see ch. 6). Beginning in mid-May 1989, enumerators (usually one per ARA) used the address registers and census maps to verify addresses, unit by unit, systematically canvassing every block in their ARA's in a clockwise direction. They would compare each address found to the ones preprinted on the address listing pages, which were bound in an address register; correct, add, and delete addresses directly on the listing pages; and updated the census maps with any feature changes.

General enumerator instructions were:

1. Verify that the basic address for every residential structure located in the ARA is listed on the address listing pages in the correct block.
2. Verify that the number of housing units given for each basic address is correct, and add any housing units located on the ground but not listed in the

address listing pages. If a multiunit structure contains more units than were listed in the address register, record the unit designations for all missing units.

3. Correct only the street name or type, house number suffix or prefix, unit designation, and directional prefix or suffix. (Procedures did not permit the correction of house numbers. If a house number listing was determined to be incorrect, the original listing was deleted and the entire correct address was added to the address add pages.)
4. Delete nonresidential and uninhabitable units on the listing pages (residential addresses were deleted if the units were open to the elements, condemned, or being demolished).
5. Identify the correct ARA/block for units listed in the incorrect block.
6. Correct the census map by adding new streets and their names, correcting the location of streets, and amending street names.

Enumerators were not required to interview at every household—only those identified by an asterisk on the address listing page (located to the left in the house-number column). In blocks that consisted primarily of single-unit structures, every third structure was identified

for contact. Enumerators were required to visit all units in some blocks. Visits were required at every basic street address that appeared to be a multiunit structure, although enumerators were not required to contact someone at every residence in such a building. Instead, they were instructed to ask a responsible person (for example, a building manager) about the correct mailing address, the total number of units, and the apartment numbering scheme. In all areas, they were to inquire about additional units at the visited and neighboring units as well. If neither a unit designation nor a lockbox number were available at a multiunit address, the enumerator entered a location description for each unit in the space provided on the address listing page and assigned a numeric unit designation for those units lacking one.

A quality assurance (QA) plan was incorporated into the precavass operation. The QA consisted of suppressing the listings for two housing units in the first block of each ARA and on-the-job training (OJT) for each enumerator's first ARA. Based upon the results of the OJT and the performance of the enumerators in adding the suppressed units, the crew leader (supervisor) could further train or review additional work performed by the enumerator.

After the precavass field work was completed, the annotated address registers were shipped on a flow basis to four PO's for processing—Baltimore, Kansas City, Jacksonville, and San Diego—where the results were keyed

Figure 3. Precavass Address Listing Page, Form D-102A

| THIS LISTING CONTAINS INFORMATION, THE RELEASE OF WHICH IS PROHIBITED BY TITLE 13, U.S.C. OMB NO.XXX-XXX APPROVAL EXPIRES XX-XX-XX |              |                    |   |                                |       |   |                         |                |
|--|--------------|--------------------|---|--------------------------------|-------|---|-------------------------|----------------|
| (9) DO: 3099   |              | (10) ARA: 4001A    |   | (11) (12) City/BNA: 027/990100 |       | (13) ZIP: 75100                                     |                         |                |
| (14) PAGE: OF  |              |                    |   |                                |       |   |                         |                |
| ID<br>(1)  | BLOCK<br>(2) | ACTION CODE<br>(3) | HOUSE NUMBER<br>(4)   | STREET NAME AND ZIP<br>(5)     |       | UNIT DESIG.<br>(6)                                  | UNIT DESCRIPTION<br>(7) | REMARKS<br>(8) |
| 1346   | 106          |                    | *1801   | DALE DR                        | 75100 |   |                         |                |
| 1347   | 106          |                    | 1803  | DALE DR                        | 75100 |   |                         |                |
| 1348   | 106          |                    | *20   | FARRAGUT PL                    | 75100 | A   |                         |                |
| 1349   | 106          |                    | *22   | FARRAGUT PL                    | 75100 |   |                         |                |
| 1350   | 106          |                    | 24  | FARRAGUT PL                    | 75100 |   |                         |                |
| 1351   | 106          |                    | 28  | FARRAGUT PL                    | 75100 |   |                         |                |
| XXXX   | XXXXX        | XXXXXX             | XXXXXX  | XXXXXXXXXXXXXXXXXXXXXX         |       | XXXXX   | XXXXXXXXXXXX            | XXXXXXXXXX     |
| 1352   | 107          |                    | *653  | KILMER AVE                     | 75100 | 1N  |                         |                |
| 1353   | 107          |                    | 653   | KILMER AVE                     | 75100 | 1S  |                         |                |
| 1354   | 107          |                    | *655  | KILMER AVE                     | 75100 | 1N  |                         |                |
| 1355   | 107          |                    | 655   | KILMER AVE                     | 75100 | 1S  |                         |                |
| 1356   | 107          |                    | *725  | KILMER AVE                     | 75100 | 101   |                         |                |
| 1357   | 107          |                    | 725   | KILMER AVE                     | 75100 | 102   |                         |                |
| 1358   | 107          |                    | *727  | KILMER AVE                     | 75100 | A   |                         |                |
| 1359   | 107          |                    | 727   | KILMER AVE                     | 75100 | B   |                         |                |
| 1360   | 107          |                    | *729  | KILMER AVE                     | 75100 | A   |                         |                |
| 1361   | 107          |                    | 729   | KILMER AVE                     | 75100 | B   |                         |                |
| 1362   | 107          |                    | *731  | KILMER AVE                     | 75100 | A   |                         |                |
| 1363   | 107          |                    | 731   | KILMER AVE                     | 75100 | B   |                         |                |
| (9) DO: 3099   |              | (10) ARA: 4001A    |   | (11) (12) City/BNA: 027/990100 |       | (13) ZIP: 75100                                     |                         | (14) PAGE: OF  |
| (9)  |              | (10)               |   | (11) (12)                      |       | (13)  |                         | (14)           |
| FORM D-102A<br>(XX-XX-XX)  |              |                    | PRECANVASS ADDRESS LISTING PAGE<br>21ST DECENNIAL CENSUS — 1990 |                                |       | U.S. DEPARTMENT OF COMMERCE<br>BUREAU OF THE CENSUS |                         |                |

and changes incorporated. Maps were sent to the geographic update system (GUS) sites located in the RCC's (see ch. 6) for eventual use in updating the TIGER file.

## ADDRESS LIST COMPILATION IN PRELIST AREAS

### Introduction

In mail census areas of the country where the TIGER file did not have the address range information required for geocoding, the Bureau compiled a residential mailing address file through a field operation called "prelist." In these areas, census enumerators created and geocoded the address list by canvassing assigned geographic areas, where almost 38 percent of the addresses in the country were located. The national prelist occurred in two phases—summer/fall of 1988 (1988 prelist—in four "waves") and fall of 1989 (1989 prelist—in one "wave").

**Identifying 1988 prelist areas**—FLD initially designated whole counties as prelist areas if the estimated population density of a county equalled or exceeded 15 persons per square mile. When the prelist operation was split into two phases (1988 and 1989), FLD increased the population density threshold for the 1988 prelist to 50 persons per square mile, to distinguish between the types of delivery selected. The majority of addresses listed during the 1988 prelist had house numbers and street names; these would be enumerated in 1990 using the mailout/mailback method because, in general, the USPS could recognize such city-type addresses as mail delivery addresses.

Most counties that contained a population density of fewer than 50 persons per square mile were designated as list/enumerate (L/E) areas (see ch. 6). The majority of these were located in the western portion of the United States. Some counties with a large number of seasonally vacant housing units also were designated as L/E areas. If an L/E county had one or more places, each of which had a minimum of 2,000 housing units served by USPS city delivery, the FLD could designate these places and their environs as "prelist pockets." Since outer boundaries of USPS city delivery areas usually did not match census-defined geography (block group boundaries), FLD extended the prelist pockets to whole blocks. Census maps identified the coverage and extent of these prelist pocket areas.

The major objectives of the prelist were:

1. To obtain and record a complete and accurate mailing address for all occupied and vacant living quarters (housing units and special places).
2. To obtain and record a physical location description (or street address if it was not used for mail delivery) and householder name for living quarters that did not have a house number/street-name mailing address.
3. To annotate the enumerator's ARA map to show the locations of all living quarters and to identify changes and updates to streets/roads and their names.

4. To assign all living quarters to their correct 1990 census collection geography (DO, ARA, block, and map spot numbers).

### Field Organization

The 1988 prelist activities were managed from 12 of the 13 RCC's (excluding San Francisco). The RCC's established "management areas" to supervise prelist activities at the regional level. Each area was divided into eight field operations supervisor (FOS) districts. Each "management area" equalled one State unless the State was too large or small, or had been split between two waves. The management structure, administrative area, edit clerks, and field supervisors were located in the RCC. To manage the prelist activities in the field, the RCC's hired FOS's who worked out of their homes or from small rental space (150 to 200 sq. ft.). RCC's also recruited other prelist management, office, and field staff. FLD asked tribal officials of American Indian reservations living within prelist areas to help recruit indigenous employees. The RCC maintained an automated file of applicants (see ch. 6) based on the requirements for each census job. The FOS's and their assistants tested all the candidates in their jurisdictions, while the RCC's hired all employees and processed the appointment forms. The RCC management staffs (including the FOS's) were trained by headquarters (HQ) personnel.

### Advance Listing

A QA operation called "advance listing" determined whether prelist enumerators did their jobs accurately. Prior to the start of prelist, an advance lister (AL) visited the first ARA and then every other ARA in the enumerator assignment area. In these areas, he/she listed and map spotted on his/her ARA map 6 consecutive living quarters in each of 2 predesignated blocks for a total of 12 living quarters in each ARA in the sample.

On the census map of each ARA assigned for advanced listing, office staff identified the starting point of the listing with a red "X" within each selected block. The AL's were required to make one callback visit at each housing unit to obtain the mailing address information. If there was a contact problem, they were instructed to ask a knowledgeable person such as a neighbor. As the AL completed the listings for each ARA, he/she returned the registers and maps to the FOS, who distributed these materials to crew leaders for matching to the prelist enumerators' address registers.

### 1988 Prelist Operation

Crew leaders conducted verbatim (scripted) training for their assigned enumerators; this consisted of 2-1/2 days of classroom instruction and 1/2 day of practice listing (in blocks where the AL had listed some addresses). At the conclusion of training, enumerators completed a final review test while the crew leader matched the first six



advance listings against the practice listings. The test and match, combined with class participation, determined if an enumerator was qualified to do the work.

Enumerators systematically canvassed (in ascending block number order) in a clockwise direction around each block within their assigned ARA, visiting all living quarters to obtain information about mailing addresses and related information. They printed the address information, occupant name, and block and map spot numbers, and entered a location description for any living quarters not having a house-number/street-name address on the blank address listing pages (form D-101A) which were bound in an address register. Enumerators also asked the occupant if there were any additional living quarters (occupied or vacant) in the building or on the property. The location of each living quarters was spotted and numbered on the census map. The map was updated with missing features and names and feature name changes, if appropriate. Enumerators were to make two attempts to contact the occupants of living quarters during prelist.

The prelist crew leaders matched the enumerators' address listings with the advance listings to determine if there was a match or nonmatch between these addresses. Based on the evaluation (the number of nonmatches), another enumerator or crew leader would recheck the advance-listed block(s) and, if necessary relist the ARA. Based on the QA sample, it was estimated that the overall error rate (AL plus prelist enumerator errors) was 11.44 percent. Of this error rate, 82.6 percent was charged to the advance lister. The QA revealed a prelist enumerator listing error rate of 2.4 percent, with approximately 11.6 percent of the error chargeable to the advance lister.

The prelist operation was split into four waves, starting in May 1988 (see table 1). The advance listing and actual prelisting for wave 1 began on schedule (June 6 and July 11, 1988, respectively). Due to problems in TIGER system development and available computer capacity required to complete the TIGER data base and produce the prelist maps, the map plot tapes for waves 2 through 4 were delayed.

The computer software that supported the automated map production was prepared under extreme time constraints. As a result, the software was designed to handle only the specific geographic situation and small processing volumes associated with the dress rehearsal sites (see ch. 4). When this software was applied to the wider range of geographic conditions and high-volume processing loads associated with the prelist operation, it required extensive revision.

The initial schedule called for a 3-week interval between waves; this was extended to 5 weeks. The original and revised starting dates for 1988 prelist field activities are shown in table 1.

As they received them from the FOS offices, office clerks in the RCC edited the prelist address registers for legibility and for incomplete, inaccurate, and/or missing entries on the registers and maps. Registers that failed edit

Table 1. **Original and Revised 1988 Prelist Wave Dates**

| 1988 prelist field operations | Wave 1             |                    | Wave 2            |                    | Wave 3             |                     | Wave 4              |                     |
|-------------------------------|--------------------|--------------------|-------------------|--------------------|--------------------|---------------------|---------------------|---------------------|
|                               | Original dates     | Revised dates      | Original dates    | Revised dates      | Original dates     | Revised dates       | Original dates      | Revised dates       |
| Advance listing . . . .       | 6/6<br>to<br>6/16  | 6/6<br>to<br>6/17  | 6/27<br>to<br>7/7 | 7/11<br>to<br>7/22 | 7/18<br>to<br>7/28 | 8/15<br>to<br>8/26  | 8/8<br>to<br>8/18   | 9/19<br>to<br>9/30  |
| Prelist field work.           | 7/11<br>to<br>8/19 | 7/11<br>to<br>8/19 | 8/1<br>to<br>9/9  | 8/15<br>to<br>9/23 | 8/22<br>to<br>9/30 | 9/19<br>to<br>10/28 | 9/12<br>to<br>10/21 | 10/24<br>to<br>12/2 |

Source: 1990 Decennial Census Memorandum No. 80, April 27, 1988.

were returned to the field for correction. Registers failed edit if they or the census map(s) had more than one error, identified with a checklist provided in the register itself.

The management area staff made a backup copy of each updated prelist census map and sent the originals to the geographic update system (GUS) sites, where the clerks updated the TIGER file with map changes (adds, deletes, feature and name corrections) to improve geographic products for subsequent applications.

Although the workload was originally estimated at 32 million housing units, the actual 1988 prelist workload was closer to 27.8 million housing units in approximately 2.27 million blocks. A total of 83,890 special places also were verified. About 4.5 million hours were spent and 47.9 million miles traveled to complete the address listings. The total cost of the 1988 prelist operation was just over \$62.55 million.

**Identifying 1989 prelist areas**—Due to the problems associated with developing an accurate mailing list for postal delivery in some rural and seasonal housing areas of the country, the Bureau changed the data collection procedures for 1990 in some parts of the country. Primarily in the South, Midwest, and Appalachia, previously designated 1988 prelist areas with mailout/mailback (MO/MB) enumeration were redesignated as 1989 prelist areas to be enumerated by update/leave (U/L) procedures. Address and mail delivery systems in these areas, covered by 7 of the 13 census RCC's, were less effective in identifying specific housing units than in 1988 prelist areas.

The 1989 prelist, conducted in the fall of 1989, took place in areas where the Bureau anticipated problems creating a list of USPS-deliverable mailing addresses (due to the nature of the address system). The majority of these addresses were rural route/box number, star route, highway contract route, post office boxes, or general delivery. Further details on the update/leave operation are found in chapter 6.

### 1989 Prelist Operation

Prelist field activities were similar for both the 1988 and 1989 prelist operations. The 1989 prelist began in October with procedures and training similar to those for 1988, and

ended in November. The 1989 prelist enumerators endeavored to list a complete and accurate address for each living quarters. If this was not possible, they were required to provide an adequate location description which U/L enumerators could use to find the living quarters. In addition, they annotated census maps to show the locations of all living quarters and updated map features. This was especially important, because U/L enumerators needed to locate these living quarters to deliver questionnaires to the correct housing units.

Approximately 10.2 million housing units were canvassed during the 1989 prelist, in 24,150 ARA's in 79 DO areas. Of the 1.36 million blocks canvassed, 68 percent contained living quarters and 32 percent did not. Approximately 31 percent of the living quarters had house-number/street-name addresses, while 32 percent of the addresses listed had rural route/box number addresses, and the remaining 37 percent were post office box, general delivery, star route, and other address types. The total cost (including advance listing) was \$21.55 million.

### Prelist Keying

Management areas shipped the completed prelist address registers to the PO's on a flow basis during the two prelist operations. PO clerks keyed the address and related information from the address listing pages to create the prelist address file and to update the special-place address file.

The receipt and check-in units at the PO's received the address registers and verified the shipments. If the ARA consisted of more than one address register, its registers were banded together. Keyers were assigned one ARA at a time while they keyed addresses from the address listing pages. Information from the Special Place Listing (Form D-329) was keyed separately and was used to create the special-place address file. The computer edited while the keyer entered information into the system. The on-line edits included the number of records keyed per page and number of pages keyed, and a check for valid entries in the block number and ZIP Code fields.

When a keyer completed an ARA, it was assigned to another keyer (verification keyer) who keyed a sample number of lines in the ARA. These were matched with the original keyer's work to determine an error rate. ARA's that had an error rate greater than 4 percent were rekeyed and then reverified.

The 1988 prelist processing involved keying approximately 27.8 million addresses in two PO's between August 1988 and January 1989. The 1989 prelist processing involved keying about 11 million addresses in four PO's within a 2-month period, beginning in November 1989 and ending in late December 1989.

Following the initial canvass and processing for the 1988 prelist areas, DOD prepared and sent the label tapes (address file tapes) to a private printing contractor who printed, labeled, and shipped the advance post office check (APOC) address cards (for APOC 2 and 3—see

below) to the appropriate local post offices. For the 1989 prelist, DOD keyed the addresses and related information from the address listing pages to create the update/leave (U/L) registers later used by enumerators to deliver pre-addressed questionnaires to the housing units during the U/L operation (see ch. 6).

### Advance Post Office Check (APOC 2 and 3)


As stated earlier, APOC was a program that had USPS carriers review address cards prepared from census address lists. Originally, the Bureau planned to include the entire 1988 prelist area in one national APOC. However, since the 1988 prelist operation for some parts of the country was completed later than elsewhere, it was decided to conduct the prelist APOC in two phases; hence, APOC 2 and 3. (APOC 1 reviewed addresses purchased by the Bureau for TAR areas (see p. 4).) APOC 2 included approximately 73 percent of the wave 1 and 2 prelisted addresses, while the APOC 3 operation had the remainder plus all the addresses listed in waves 3 and 4. The 1989 prelist (U/L) addresses were not checked during APOC 2 or 3 prior to addressing the questionnaires, since the USPS was not involved in their delivery. As scheduled, the APOC 2 operation began in late January 1989 and was completed by mid-February; APOC 3 began in late March and was completed by mid-April 1989.

The printing of APOC 2/3 address cards (form D-700A; fig. 4) went as scheduled—approximately 9 million cards for APOC 2 and 12 million cards for APOC 3 (see below). Because these files were for rural-type areas, the contractor was requested to sort the address cards by carrier route. One problem discovered during the card preparation was that the contractor's sorting software did not have the capacity to sort rural-style addresses such as "rural route 1, box 25." Postal clerks had to do this, at \$0.15 per card.

During the APOC 2 and 3, the USPS reviewed the address cards and identified addresses that were deliverable, undeliverable, and duplicates of other cards by casing them just as it did for APOC 1 (see p. 4). The USPS also corrected incorrect or incomplete address cards and provided addresses on blue add cards, (form D-702; see p. 6) for housing units not represented by a card. Carriers classified 78.8 percent of the addresses as "deliverable as addressed," 10.1 percent (approximately 2 million) as "undeliverable," and 2.7 percent as duplicates. They provided valid corrections for approximately 4.1 percent and unacceptable corrections for 4.3 percent of the cards.

Changes in procedures from the APOC 1 operation required a revision to the USPS training manual. Since special places were not included on the label tape sent to the vendor for APOC 2 and 3 operations, the USPS was requested not to complete add cards for special places. During APOC 2, many unnecessary add cards (blue cards) were written for special place addresses that the Bureau had already compiled, but after further clarification, this was less of a problem for APOC 3. To lessen the amount

Figure 4. APOC Address Card Used for APOC 2/3, Form D700A (Buff Card)

|                                  |                          |  |              |            |
|----------------------------------|--------------------------|--|--------------|------------|
| 455<br>HOUSE NUMBER              | W 34TH ST<br>STREET NAME | 1E<br>UNIT DES.  | 10001<br>ZIP | 0128<br>CR |
| HOUSEHOLDER NAME                 |                          | NEW YORK<br>CITY   | NY<br>ST     |            |
| 0984 6925 117 4862<br>GEO NUMBER |                          | 000500014774<br> |              |            |

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|                                 |                                     |   |
|---------------------------------|-------------------------------------|---|
| FORM <b>D-700A</b><br>(2-12-88) | <b>APOC ADDRESS CARD</b>            | U.S. DEPARTMENT OF COMMERCE<br>BUREAU OF THE CENSUS |
|                                 | <b>21st Decennial Census - 1990</b> | <b>00001511</b>                                     |

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The release of this information to the Census Bureau is authorized under 39CFR 266.4 (b) (2) (v).

of adds located outside of counties not entirely enumerated using mail census procedures, maps of prelist pockets were provided to show carriers the mailout/mailback boundaries.

USPS personnel were asked to annotate each add card with the geocode of the nearest deliverable address located on the same side of the street as the added address. In addition, they entered a location description for any housing unit that had a rural route/box number or general delivery address. The final cost of the APOC 2 and 3 operation was \$17.48 million. Of the 27.8 million addresses collected during prelist, just over 20 million were sent to the APOC 2 and 3 operations. The remaining addresses were not sent because they were in ZIP Codes included in the APOC 1 operation or had incomplete addresses. Approximately 1.5 million addresses withheld from APOC did not contain enough address information for carriers to review.

PO's used the same processing procedures for APOC 2 and 3 as they did for APOC 1. Materials were checked in by ZIP Code and only corrections, undeliverable addresses, and duplicates were processed (keyed into the address files or flagged). All add cards (blue cards) were sorted by ZIP Code and stored at the PO's until the beginning of the APOC reconciliation operation.

### APOC 2 and 3 Reconciliation

In the APOC 2 and 3 reconciliation operations, the MDO's resolved and verified additions made to the census prelist address list developed for the 1988 prelist areas by the USPS through the APOC 2 and 3 operations. PO's sent the add cards that they had stored from the APOC 2 and 3 operations to the appropriate MDO's for field resolution; that is, verification and geocoding. The APOC 2 reconciliation operation began on June 13 and lasted until July 22,

1989. APOC 3 reconciliation began on August 21 and ran through September 1989. DOD (headquarters) provided the MDO's with address print files, from which they printed the address listing pages (form D-109). These, containing all the 1988 prelist addresses and APOC corrections in DO/ARA/block/map spot order, were assembled into binders to make address registers.

The MDO clerical staffs sorted the blue cards into three groups: (1) All blue cards with house-number/street-name addresses, regardless of whether they had USPS-transcribed geocode numbers on them, (2) all rural-style addresses that had USPS-transcribed geocode numbers on them, and (3) any group of 10 or more nonhouse-number/street-name addresses on the same road or carrier route that did not have USPS-transcribed geocode numbers on them. After sorting, the cards from the first two groups were put together with the appropriate address listing pages in preparation for field reconciliation. The crew leaders took the cards from group 3 to the local post office and attempted to locate and geocode them. If enough information was obtained, they were assigned to the appropriate enumerators for field resolution.

Enumerators, under the supervision of crew leaders, visited housing units to verify and resolve the USPS information. Enumerators tried to obtain the correct mailing addresses for cases that the USPS reported as undeliverable, including those cases reported as duplicate mailing addresses; they used the map spot numbers and annotated maps to find these units. They also tried to locate the addresses provided on the blue cards for adds to determine if they should be added to the address file. In addition to these tasks, enumerators tried to resolve prelist clusters; that is, housing units and/or special places identified during prelist as not accessible (because of snow, floods, or washed-out roads) or having other problems. They also

updated the original 1988 prelist maps. Because enumerators were allowed only one visit during this operation, they attempted to contact knowledgeable persons if no one was at home, or to verify by observation as a last resort if they could not contact someone.

After reviewing the registers, clerks removed the annotated address listing pages and shipped them on a flow basis to the appropriate PO's (Baltimore, Kansas City, Jacksonville, San Diego). At the end of the operation, MDO's sent all geocoded and ungeocoded blue cards to the designated PO's and shipped the census maps to their respective RCC's.

**Quality assurance**—To ensure that each enumerator was performing the job correctly, the crew leader conducted a first review of each enumerator's work and, after completion of an ARA, a final review of the listing pages and map. When the crew leader returned the completed work to the MDO, a cursory clerical review ensured that the proper information had been supplied.

**Post-APOC processing**—The PO's checked in the address listings, and bundled the blue cards and sent them to the library for storage. The PO's sent the address listings from the check-in unit to the data entry unit, where a control clerk assigned one ARA at a time to keyers who entered all adds, corrections, and deletes from the registers. PO's conducted on-line data entry edits and quality assurance, which consisted of a sample verification, with the verifier correcting all detected errors. DOD removed all addresses identified as duplicates during APOC and confirmed as duplicates during APOC reconciliation. The total cost of the APOC 2 and 3 reconciliation operations was approximately \$14.18 million.

## THE ADDRESS CONTROL FILE (ACF)

The cornerstone of the mail census method of enumeration is a complete and accurate master address list. For the 1990 census, there was an overall address control system, consisting of electronic files and programs, used to develop, maintain, update, and utilize a decennial census master address list, known as the address control file, or ACF. This file uniquely identified every collection unit (housing unit and group quarters) in the census. It was a geographically structured file that contained about 100 million unit records within approximately 7 million census blocks. Developed and updated through the activities described in this chapter, it made flow processing of census questionnaires on an individual basis possible for the first time in census history. The ACF received and/or shared and exchanged information with files and programs elsewhere in the address control system and with the FLD collection control system (CCS; see ch. 6), the PO's data control system (see ch. 7), and DPLD's management information system (see ch. 6). The Bureau kept the ACF

on the mainframe computer at headquarters, updated it weekly throughout the census, and used it to mail a questionnaire to each unit in mailout areas, monitor the mail returns, and control the enumeration of nonresponse and other followup cases.

## ACF Component Files and Creating the ACF

As described earlier in this chapter, the initial TAR address file was generated from tapes purchased from a commercial vendor, while the initial prelist and update/leave files were generated from the keying of address information contained in the prelist address registers. The initial special-place file came from special-place tapes and lists (obtained through government and private sources), supplemented by keyed information gathered during pre-census field operations.

**Tape address register files**—GEO geocoded the TAR addresses (DO/ARA/block) by linking them to address range records and street segments in the TIGER file (see ch. 3), which provided the geographic structure for creating the ACF. APOC 1 results were incorporated into the TAR address file, which then was structured into TAR ACF's—one for each DO responsible for any TAR area, and then into precanvass assignments grouped by MDO and shipped (on tape cartridges called TK-70's) to the MDO's. MDO's used these tapes to print address registers and carry out the precanvass operation.

The final step in the TAR ACF development was to match the addresses on the updated precanvass file with the ungeocodable addresses (yellow card addresses; see p. 7). This match identified and eliminated duplicate records and flagged cases for precanvass reconciliation (yellow card coding; see p. 16)—records that had matching addresses but conflicting geography.

**1988 prelist address files**—The initial 1988 prelist address file was created by keying the address registers and sorting the addresses geographically by DO, ARA, block, and map spot numbers, and generating label tapes consisting of all addresses in the file. After APOC 2 and 3 processing, the prelist address file was updated to reflect the results. This version of the prelist address file was the base for generating listings for the APOC 2 and 3 reconciliation operations (see above) as well as the APOC add cards that were not keyed during APOC processing.

The APOC 2 and 3 reconciliation address files and software to format and print these files were downloaded and sent to the MDO's, where the APOC reconciliation address registers were printed and enumerators reviewed the changes. The address adds, corrections, and deletes were keyed at the PO's and the resultant data file was transmitted to HQ and compared with the prelist address file. With the reflection of the APOC reconciliation information on the prelist address file, the mailout/mailback universes (TAR and 1988 prelist) were ready to be merged.

**1989 prelist address files**—As the 1989 prelist was completed, registers were shipped to the PO's for keying. The address files were transmitted to HQ, where they were sorted by DO, ARA, block, and map spot number. These addresses comprised the basis for the update/leave (U/L) enumeration areas and were used for the U/L operation. Addresses added during the U/L operation were not added to the file until much later.

## Master ACF

The address files for these three types of enumeration areas, which constituted the mailback census universe, were now ready to be structured into the master ACF. This process involved systematically selecting and flagging the census sample units (which would receive a long-form questionnaire) as defined by the Bureau's Population (POP) and Statistical Support (STSD) Divisions. Permanent and unique census identification numbers (ID's) were assigned to all units.

The ACF was indexed by DO, ARA, and block number, and contained primarily address-related information such as block number, address, unit description, and location description where appropriate. With the assignment of permanent ID's to the unit records in the ACF, an identification file (IDF) was created for each DO's ACF.

## ACF Products

With the sample selection and assignment of ID numbers for all units in the ACF complete (December 1989), the master ACF was ready to be used to produce the files, tapes, and printouts needed to support, manage, and control the census mailout and field coding operations. Some of the first products that the ACF produced were:

**Yellow card/precavass reconciliation address tape**—a residual file of uncoded TAR addresses created from the geocoding process (see p. 5). This file was matched to the master ACF; addresses on the yellow card file found on the TAR file were discarded, and addresses that were not matched were placed on a label tape and sent to a vendor to print ARA and Block Coding Cards, Form D-374, commonly called yellow cards (see fig. 5). These cards, along with the precavass reconciliation cases, were geocoded during the yellow card office and field coding operation (see p. 16).

**Mailing address tapes**—The mailing address tapes took several forms, depending upon the universe they represented. For mailout areas, short- and long-form questionnaire address tapes were prepared and shipped to the questionnaire printers.

These tapes had several samples of addresses suppressed because of various research and evaluation projects such as the alternative questionnaire studies (see ch. 11). A complete mailout address tape was created for printing the address cards (form D-701)

used by the USPS during the census address check (see p. 15). Tapes of short- and long-form addresses to be printed on questionnaires for the U/L areas also were created and sent to the printers of questionnaires for the U/L universe.

These addressed questionnaires were shipped directly to the DO's for delivery by enumerators.

## ACF Maintenance

ACF maintenance was the data entry of specific types of changes, moves, adds and/or deletions made to files for housing units and group quarters. These changes were made as a result of census enumerators' findings in the field, and by PO staff for specific operations. During the census, the DO's sent form D-110A from block splits (see ch. 6), forms D-351 (HU) and D-351 (GQ) from special place prelist (see ch. 6), and the ACF Maintenance Record, Form D-378, to the ACF maintenance unit in the Baltimore PO for keying. The keyed data were sent to a mainframe computer at HQ via a dedicated transmission link. These records were compared to the master ACF and were either accepted or rejected. The results (changes accepted or rejected) were sent to the Baltimore PO, where they were printed on lists that were sent to the DO that submitted the information. The lists included a coded sheet that described the reasons for rejection, while all accepts were included on the ACF update tapes with a census ID number. DO's reviewed these sheets and submitted new D378's for any corrections.

The types of actions performed during the maintenance were:

**Add** added unit records to the ACF.

**Move** changed the geocode and moved an existing unit record or basic street address from one ARA and/or block to another.

**Kill** removed records from the ACF.

**Unduplicate** where duplication involved a unit record coded to two or more blocks, it killed the incorrect record to assure that the questionnaire data were associated with the correct geography.

Maintenance of the ACF was done throughout the census, with the master ACF maintained at least once a week.

## ACF Updating

The ACF updating operation involved moving and transferring information between HQ, PO's and DO's (via the TK-70 tape cartridges). This interchange provided headquarters with details of mail return check-in, surname capture, nonresponse followup check-in, and other vital information. The data exchange from HQ to the DO's reflected operational status, results of the latest ACF maintenance activity, and the PO data capture status of each housing-unit ID.

Each week, DO's copied information from their minicomputers onto tape cartridges and shipped them via overnight air express to HQ, where the files were read and operational status flags set on the IDF. For type 1 DO's operations done in the PO's (mail return check-in, surname keying, etc.), the interchange of information was accomplished through direct transmission of data between PO and HQ computers. Information from the PO's to the type 1 DO's was sent by tape cartridges.

### ADDRESS AND GEOGRAPHIC REFERENCE MATERIALS FOR THE FIELD OFFICES

DO's were provided various address and geographic reference materials that enabled the staffs to perform their jobs. These map products were contained in a package for each DO, RCC, and PO, known as an office atlas. The maps were used for recruiting, locating living quarters and streets, developing and making assignments, and as references for enumerators, crew leaders, and FOS's. Map sheets and listings had unique identification numbers represented by bar codes. The following describes some of these materials (see also ch. 3).

#### County Locator Map and Map Sheet Indexes

The county locator map consisted of one or more map sheets and one map sheet index for each county. The map(s) displayed major roads, railroads, and water features as well as international/American Indian reservation/State/county/ARA/ boundaries; the names of map features and places, such as roads and incorporated places; and ARA, county, and DO numbers (codes). These maps were used primarily by the recruiter, FOS, special place operations supervisor, advance listers, and crew leaders to find assignment areas and plan their general routes of travel.

The map sheet index showed information such as the county boundary outline, the layout and relationship of the map sheets, and the numbers of county map sheets comprising the corresponding county locator map. This index also displayed DO boundaries if the county contained two or more DO's.

#### Street Indexes

The street index was part of the office atlas. It listed all street and road names for a county in alphabetical and numerical order, followed by the ARA number(s) in which each street or road appeared. If a county had two or more DO's, the index identified the DO as well.

#### Listings

**Listing of map sheets by ARA**—This listing was plotted for use primarily in controlling the map assembly operation. It was included in the office atlas for use as a reference

document, and contained the State and county names and codes. For a multi-DO county, each listing was divided by DO as shown:

|          |                               |          |                    |
|----------|-------------------------------|----------|--------------------|
| DO 2957  |                               | DO 2958  |                    |
| ARA 1061 | Sheet 1                       | ARA 1731 | Sheet 1<br>Sheet 2 |
| ARA 1062 | Sheet 1<br>Sheet 2            | ARA 1732 | Sheet 1            |
| ARA 1063 | Sheet 1<br>Sheet 2<br>Sheet 3 | ARA 1733 | Sheet 1            |

**Listing of ARA's by map sheet**—There was a similar listing by map sheet number; for example:

|         |        |  |
|---------|--------|--|
| Sheet 1 | DO-ARA | 2957 1061<br>2957 1062<br>2957 1063<br>2958 1731<br>2958 1732<br>2958 1733 |
| Sheet 2 | DO-ARA | 2957 1062<br>2957 1063<br>2958 1731  |

#### CENSUS ADDRESS CHECK (CASING CHECK)

Prior to Census Day, the USPS conducted its census address check (CAC) to update the address list. Similar to APOC, the CAC was a casing operation in which the USPS verified that there was a Census Address Card (Form D-701) for every housing unit in the mailout/mailback areas. This operation began on February 26 and ran through March 16, 1990 (some post offices did not complete casing until March 26 because they received their cards late from the printing contractor). Each carrier checked the preprinted address on the card and placed (cased) the address card into the appropriate slot. Carriers marked the undeliverable cards with the appropriate reasons for non-delivery and identified duplicates, but were not required to correct information on the cards since there was not enough time to enter these corrections on the ACF before questionnaire delivery.

They completed a Post Office Report of Missing Addresses Casing Check, commonly called a "blue card," Form D-722 (see fig. 6), for any residential address without an address card. After casing, carriers returned their cards in bundles (according to type) to their USPS supervisor or his or her designee who was responsible for the quality assurance review.

DO personnel picked up all address cards from the post offices in their areas. Clerks checked in the undeliverable cards as postmaster returns. Blue cards then were processed during the blue card office/field coding operation (see below). The final cost of the address check operation was \$11.5 million.



## Field Coding

Field coding was the operation in which DO staff located addresses (from TAR geocoding and the 1988 prelist casing check) that were uncoded, or TAR addresses that had two or more geocodes, and attempted to assign them to their correct collection geography.

**Yellow card office and field coding**—As mentioned above, the Bureau attempted to geocode all TAR addresses by computer, but it could not code approximately 1.3 million of them. A second component of the yellow card workload was the resolution of basic street addresses (BSA's) with inconsistent census geography—about 735,000 prec canvass reconciliation cases. These types of cases resulted when:

1. An enumerator added a BSA to a census block, but did not delete it from the block in which the ACF had shown it, resulting in a duplicate record.
2. An enumerator added a BSA to a census block (that did not exist elsewhere in the ACF), but did not code it to the block number containing the address range where the address would be located if it were in the normal sequence.
3. One or more enumerators added the same BSA to two or more different ARA/blocks.

DOD sorted the ungeocoded TAR addresses by ZIP Code, and a vendor printed each of these addresses on an ARA and Block Coding Card, Form D-374 "yellow card" (see fig. 5). DOD shipped the yellow cards, based on ZIP Code, to the primary DO (the one with the majority of the cards for that ZIP Code). The primary DO forwarded any yellow cards outside its boundaries to other DO's served by the same ZIP Code. The office and field coding of yellow cards took place between January 7 and 18, 1990.

The assistant manager for office operations assigned uncoded vendor and APOC 1 yellow cards to office clerks to geocode. Office clerks compared the uncoded yellow card address against the TAR block header record (BHR), Form D-327. If the address card could be matched against the BHR, it was then matched against form D-108A (printed copy of the ACF). If found on the D-108A, the address was considered a duplicate; if not, clerks coded the address card from the geocodes on the BHR. If the address did not match the BHR, and the address was a house-number/street-name address, it was sent to the field for geocoding. Precanvass reconciliation yellow cards and any house-number/street-name addresses not geocoded in the office were referred field coders who located addresses on the ground, made address corrections, and geocoded the address by comparing the location to the ARA maps to determine the DO/ARA/block numbers. If the field coder was successful in geocoding the address, he/she compared it with the address list, form D-108 (printed copy of the ACF). If the address matched, it was considered a duplicate; if it did not match, the field coder entered the geocode on the yellow card.

The DO clerks entered the geocoded adds on form D-378, ACF Maintenance Record, and sent them to the PO for processing. After ACF maintenance, DOD sent the tape of the yellow card adds to the printing contractor producing the questionnaire mailing pieces.

**Blue card coding**—For 1988 prelist areas, the USPS filled out blue address cards, form D-722 (see fig. 6). DO personnel picked up these cards from post offices in their areas. In both TAR and 1988 prelist areas, office clerks attempted to geocode the blue cards with house-number/street-name addresses. This operation began on March 19 and ended on April 13, 1990. Any cards that could not be coded in the office were sent to the field to be coded. The field coders determined the status of the cards and in

Figure 5. ARA and Block Coding Card, Form D-374 (Yellow Card)

|              |                                   |                                     |         |          |
|--------------|-----------------------------------|-------------------------------------|---------|----------|
| House number | Street name                       | Unit designation                    | PO name | ZIP Code |
| DO code      | (Primary)<br>ARA and block number | (Secondary)<br>ARA and block number |         |          |

|   |   |
|---|---|
| <b>1. ENUMERATOR USE ONLY</b><br><hr/> <b>a.</b> DO code<br>_____<br><hr/> <b>b.</b> ARA number<br>_____<br><hr/> <b>c.</b> Block number<br>_____ | <b>2. Remarks</b><br>_____<br>_____<br>_____<br>_____ |
|---|---|

FORM D-374  
(10-12-89)

U.S. DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS

### ARA AND BLOCK CODING CARD 21st Decennial Census — 1990

OMB No. 0607-0658: Approval Expires 05/31/90



Figure 6. Post Office Report of Missing Addresses—Casing Check, Form D-722 (Blue Card)

|   |                              |   |                 |   |                              |  |                 |   |  |
|---|------------------------------|---|-----------------|---|------------------------------|--|-----------------|---|--|
| 1. House No.<br>104   |                              | 2. Street name or rural route and box No.<br>ARCADIA ST |                 | 3. City<br>ANYTOWN                                  |                              | 4. State<br>TX   |                 | 5. ZIP Code<br>75100  |  |
| 6. Special place name or type — See instructions on back of card.   |                              |   |                 |   |                              | 8. GEO No. of nearest DELIVERABLE unit on same side of street<br>3 0 9 9 4 0 1 0 2 0 1 X X X X |                 |   |  |
| 7. Unit designation — FBI (a) or (b) as appropriate for each unit at a multiunit address.                       |                              |   |                 |   |                              | 9. Location information for rural route/box No. type addresses                                 |                 |   |  |
| Line No.  | Apartment or trailer No. (a) | Location description (b)                                | CENSUS USE ONLY | Line No.  | Apartment or trailer No. (a) | Location description (b)   | CENSUS USE ONLY | a. Householder name   |  |
| 1   |                              |   |                 | 7   |                              |  |                 | b. Street or road name  |  |
| 2   |                              |   |                 | 8   |                              |  |                 | c. Nearest intersecting street or road on each side of the housing unit |  |
| 3   |                              |   |                 | 9   |                              |  |                 |   |  |
| 4   |                              |   |                 | 10  |                              |  |                 |   |  |
| 5   |                              |   |                 | 11  |                              |  |                 |   |  |
| 6   |                              |   |                 | 12  |                              |  |                 |   |  |
| FORM D-722 (2-18-88)<br>POST OFFICE REPORT OF MISSING ADDRESSES<br>CASING CHECK<br>21st Decennial Census — 1990 |                              |   |                 | U.S. DEPARTMENT OF COMMERCE<br>BUREAU OF THE CENSUS |                              | 10. CENSUS USE ONLY  |                 |   |  |
| DO 3099   |                              | ARA 4010  |                 | Block 201   |                              | Map spot   |                 |   |  |
| Mark (X) one box  |                              | ID number   |                 | Form type   |                              |  |                 |   |  |
| <input type="checkbox"/> Add <input checked="" type="checkbox"/> Match  |                              | 703 5015  |                 | S   |                              |  |                 |   |  |

The release of this information to the Census Bureau is authorized under 39CFR 286.4(b)(2)(vi).

some cases (prelist areas) mapspotted the locations of the addresses on census ARA maps.

After office/field coding of the blue cards was complete, all adds were entered on form D-378 and sent to the PO for processing/keying for addition to the ACF. All blue cards were sent to the census facility in Jeffersonville, IN, for storage. DO's were responsible for addressing and mailing questionnaires (called added-unit packages) to those addresses added during field coding.

### Mail Reminder Cards

On March 30, approximately 7 days after the initial questionnaire mailout, the USPS delivered a mail reminder card, form D-9, to all residential addresses in ZIP Codes in the mailout/mailback and update/leave enumeration areas, to remind people to complete and return their census questionnaires by mail as soon as possible. DPLD developed the specifications for the Government Printing Office (GPO) printing contract, awarded in mid-January 1990, to print (for just under \$979,000) and ship 100 million of these cards. This was a simplified addressed card that used the address "Residential Customer - Local"; therefore, an exact address was not required. DPLD provided the contractor with ZIP Codes and carrier route information for mailing the cards. The contractor printed and packaged them by carrier route within ZIP Code, and bundled them in groups of 50.

### QUESTIONNAIRE PRINTING AND ADDRESSING

More than 250 million questionnaires were printed for the 1990 stateside census. Since the questionnaires were the heart of the data collection effort, their development,

production, and addressing required most of the personnel and financial resources devoted to public-use forms. Most of the questionnaires were produced by private-sector contractors that were awarded contracts at the conclusion of a competitive bidding process administered by the GPO. The contract requirements were reviewed by Census Bureau personnel, who also visited the printers and devised QA software. A team of Bureau and GPO personnel periodically supervised all aspects of questionnaire production and QA at contractor's plants across the Nation.

### Number and Types of Forms Required

Table 2 lists final and cost information for the principal public-use forms. (For questionnaire content, see ch. 14; for facsimiles, see app. C.)

The total number of individually addressed short- and long-form questionnaire mailing packages assembled for the 1990 census are listed in table 3.

### General Design and Development

There were some major changes in the production of the questionnaire mailing packages for 1990 from the 1980 census. For each of the 1990 major mailing packages, bid invitations were issued for the entire production operation, with the end product a complete mailing package ready to enter the postal system.

Efforts to plan the questionnaire began in 1984 with a series of 65 local public meetings to gather recommendations from data users throughout the country, and subsequently from numerous other sources (see chs. 2 and 14), for trial in test censuses and surveys during the decade. The most important of these was the 1986 National

Table 2. Selected Information on 1990 Public-Use Forms

| Form   | Form number | Quantity printed | Approximate production cost |
|--|-------------|------------------|-----------------------------|
| Short-form questionnaire mailing package                           | -           | 82,878,781*      | \$1,479,800                 |
| Short-form added-units mailing package                             | -           | 12,405,000       | 1,979,200                   |
| Long-form questionnaire mailing package                            | -           | 17,151,236**     | 7,544,600                   |
| Long-form added-units mailing package                              | -           | 2,480,000        | 855,700                     |
| Short-form enumerator-administered questionnaire                   | D-1A        | 68,004,000       | 2,515,100                   |
| Short-form enumerator-administered questionnaire reprint (5-30-90) | D-1A        | 2,000,000        | 100,000                     |
| Spanish short-form questionnaire                                   | D-1(S)      | 1,800,000        | 200,000                     |
| Spanish short-form questionnaire reprint (9-22-89)                 | D-1(S)      | 1,000,000        | 82,000                      |
| Long-form enumerator-administered questionnaire                    | D-2A        | 33,000,000       | 4,164,900                   |
| Spanish long-form questionnaire                                    | D-2(S)      | 1,450,000        | 312,300                     |
| Instruction guide (short-form mailing package)                     | D-3         | 80,879,000       | ***                         |
| Instruction guide (long-form mailing package)                      | D-4         | 18,180,000       | ***                         |
| Outgoing envelope (short-form mailout)                             | D-6(BR)     | 73,600,000       | ***                         |
| Outgoing envelope (U/L enumerator delivery)                        | D-6(UL)     | 11,500,000       | ***                         |
| Outgoing envelope (long-form mailout)                              | D-7(BR)     | 14,200,000       | ***                         |
| Outgoing envelope (U/L enumerator delivery)                        | D-7(UL)     | 2,583,000        | ***                         |
| Return envelope (short-form)                                       | D-8A        | 94,461,000       | ***                         |
| Return envelope (long-form)  | D-8B        | 18,200,000       | ***                         |
| Mail reminder card   | D-9         | 100,000,000      | 978,900                     |
| Advance census report (ACR)  | D-13        | 6,130,750        | 926,800                     |
| Motivational insert  | D-14        | 120,283,700      | ***                         |

\*Includes 2 million prior-to-production copies.

\*\* Includes 1 million prior-to-production copies.

\*\*\*Cost is included in individual mailing package totals.

Source: 1990 Decennial Census Informational Memorandum No. 154, February 14, 1991.

Content Test (see ch. 2). As required by law, the Bureau submitted the topics planned for inclusion in the 1990 census to Congress on March 27, 1987, followed by the precise questions chosen on March 31, 1988. The required clearance package for the 1990 census questionnaires was prepared and submitted to the Office of Management and Budget (OMB) on June 1, 1988, with OMB clearance received on July 28, 1988.

The 1986 test census involved a major innovation in variable printing, computerized imaging with inkjet equipment. This eliminated the standard labeling operation by

printing the unit address and a bar code, which was a graphic representation of each housing unit's identification number, directly on the questionnaire. This bar code was read by manual wand in the DO's or laser sorting equipment in the processing offices, expediting both check-in and ACF updating.

Inkjet imaging not only improved the addressing procedures and increased the processing speed, but it also allowed the encoding of unit identifiers on the data pages, thereby linking the data reported by respondents automatically to the appropriate housing unit. This eliminated the clerically intensive operation of entering ID numbers by filling in circles in the "For Census Use" box on all encoded mailout/mailback questionnaires.

Few printers had the equipment and technical expertise to do inkjet imaging on two sides of the same sheet simultaneously, however. Inks used for the 1986 test were water soluble, and permanent inks were desirable because of the reduced risk of moisture damage to the addresses and bar codes. A private contractor that produced the inkjet imagers and inks received funds from the Bureau's Technical Services Division to develop permanent inks for its imagers. The print contractor, using these inks, successfully produced short-form questionnaire mailers for the 1987 test census and the 1988 dress rehearsal. This contractor was underbid for the short-form mailer, although it was successful in obtaining part of the 1990 long-form mailer contract with two other companies. (See below.)

The USPS assigned a unique ZIP-plus-4 (also called a POSTNET) bar code for each DO to which respondent questionnaires were returned by mail. This code, which allowed for automated sorting of the return mailing pieces

Table 3. Short- and Long-Form Questionnaire Mailing Packages

| Item  | Form number | Quantity assembled |
|---|-------------|--------------------|
| Short-form questionnaire package (mailout/mailback addresses) | —           | 72,511,366         |
| Short-form questionnaire package (update/leave addresses)     | —           | 8,030,943          |
| Subtotal  |             | 80,542,309         |
| Questionnaires (open/unaddressed—used for adds)*              | D-1         | 336,472            |
| Total   |             | 80,878,781         |
| Long-form questionnaire package (mailout/mailback addresses)  | —           | 13,902,958         |
| Long-form questionnaire package (update/leave addresses)      | —           | 2,156,957          |
| Subtotal  |             | 16,059,915         |
| Questionnaires (open/unaddressed—used for adds)*              | D-2         | 91,321             |
| Total   |             | 16,151,236         |

\*The number of packages was based on the estimate of yellow card adds. The unaddressed packages were assembled to cover the shortfall between the estimated and actual number of addresses given to the contractor on the final address tape. Source: 1990 Decennial Census Informational Memorandum No. 154, Feb. 14, 1991.

to the PO destination, was computer printed on the questionnaire as part of the addressing operation, and showed through a window at the bottom right of the return envelope. The POSTNET bar code sorting also gave the USPS an automated way to determine (for postage billing purposes) the number of mailing pieces returned by mail.

The Bureau originally requested permission from the USPS to move the phrases "Penalty for Private Use" and "Official Business" from under the return address and incorporate them into the postage indicia to make room for the census logo. The USPS denied the Bureau's request, citing a Federal regulation that requires these phrases to be under the return address. The envelope then was redesigned and the logo was placed on the right hand side under and to the left of the indicia. USPS granted permission to delete references to "Third Class" and "Bulk Mail" from the postage indicia.

**Contracts for production of questionnaires and mailing packages**—Delayed in part by uncertainties over questionnaire content, the GPO did not begin issuing invitations for bids (IFB's) for the initial questionnaire mailing packages until December 29, 1988, for the short form and February 7, 1989, for the long form, about 3 to 4 months later than scheduled. The IFB's included QA plans and all technical specifications for printing as well as the mailing/delivery requirements.

The \$17.5-million contract to manufacture, address, and assemble the short-form initial mailing package was awarded to one private contractor headquartered in Illinois on February 18, 1989, the largest single-product award ever made by the GPO. Whereas the contractor for the short-form mailers for the 1986 through 1988 tests used inkjet equipment for addressing and coding, the selected contractor used ion deposition, a dry-toner/heat-fused system (similar to office laser printers). Since ion deposition was toner-based, there was no concern about water solubility, although there was concern about toner fade and ruboff. Bureau personnel tested the toner and were satisfied with the results. There were no reported problems using this technology.

The approximately \$7.5-million long-form initial mailer contract was awarded on March 27, 1989, to a consortium of three firms. The leading contractor produced the inside pages (pages 3-18), the motivational insert, and the instruction guide. Another contractor, a specialist in inkjet imaging, printed the outer cover for the long-form questionnaire and did the variable addressing and encoding. The imaged outer covers and inside pages were shipped to a third contractor for stitching, trimming, folding, and inserting into the outgoing envelope along with the motivational insert, instruction guide, and return envelope.

The contracts for both questionnaire mailing packages required the vendors to produce, as samples, large quantities of mailing pieces—2 million short and 1 million long forms—in the spring of 1989. The Bureau included this provision so the contractors could prove that they could

meet the contract requirements while simulating a large-scale, full production run. This trial run not only assured the Bureau and GPO that the contractors could do the job, but also allowed the contractors to gain experience.

The bids for producing the questionnaire packages and other forms were lower than expected. As a result, the production costs as a whole were well below the 1989 budget allocation for public-use forms.

**Printing procedures**—Offset printing of the mailing package components began in August 1989 to produce an initial stockpile of unaddressed and uncoded questionnaires, instruction guides, motivational inserts, and envelopes. The contractors suspended and restarted production of these components as necessary. The long-form outer wrap, which was imaged (addressed and encoded) and then bound to pages 3 through 18, was printed only several days before the imaging began in the latter part of October 1989.

Short-form questionnaire initial mailing packages were assembled at two sites—in Maryland for the eastern, and in Utah for the western, United States.

The GPO produced the list/enumerate short form (D-13), called an Advance Census Report, and some relatively small supplementary reprints of Spanish-language short forms (D-1S) and the enumerator-administered short form (D-1A) on sheet-fed presses.

Short-form envelopes were produced by four contractors at plants in Pennsylvania (2), Colorado, and Oregon, and long-form questionnaire envelopes by another, located in Washington State.

### Quality Assurance

Each GPO contract for producing FOSDIC questionnaires, whether for postal delivery or enumerator use, incorporated detailed quality assurance (QA) plans. These contracts also allowed authorized GPO and Census personnel to make unannounced inspections of printing and other production plants to monitor the contractor's adherence to the QA plans. QA plans, designed to detect and correct systematic errors, covered a full range of printing attributes (ink density, ink show-through, width of FOSDIC circle walls, broken type, splatter, paper whiteness) and production steps, including position of folds, inserting, postal packing, and so forth. Contractors for the questionnaire mailing packages verified each component on line during each stage of the production process.

The contracts required the selection for QA of a systematic cluster sample of questionnaires or mailing packages. If the first item in a cluster was defective, then the second item was inspected. If both articles had a similar type of error, the search was expanded until the error was no longer found. Contractors were required to maintain a record of inspection for printing FOSDIC forms and mailing-package construction. In addition, the Bureau, with GPO assistance, established an independent QA operation at the DPD in Jeffersonville, IN. Each FOSDIC questionnaire contractor shipped (via overnight service) daily production samples for evaluation.

Before printing the FOSDIC questionnaires, the long- and short-form contractors were required to submit samples of the paper stock for testing by GPO staff. In the printing specification, paper stock was stipulated to be "white opacified book"; however, "white" was never defined. The contractor for the enumerator-administered long-form questionnaires had difficulty meeting the brightness standards. The paper suppliers (for the contractors) had added a dark tint to the pulp, which made the paper stock a bluish gray. The Census Bureau evaluated a sample of the forms that were printed on this stock and found that it filmed better than the white stock used previously.

## Scheduling

As mentioned, offset printing and stockpiling of the mailing package components began in August 1989. The outer wrap for each long-form questionnaire (pages 1-2 and 19-20) was printed several days before the imaging began in the latter part of October 1989. Imaging was driven by the address tape delivery dates. The contracts specified four tape delivery dates for the initial mailing packages and gave the approximate numbers of addresses (or forms) associated with each delivery, as shown in table 4.

Table 4. **Address Tape Delivery Dates and Estimated Numbers of Addresses**

| Delivery dates |          | Estimated number of addresses or forms (millions) |            |
|----------------|----------|---|------------|
| Scheduled      | Actual   | Short form*                                       | Long form* |
| 10/13/89       | 10/13/89 | 53  | 11         |
| 12/01/89       | 10/13/89 | 18  | 4          |
| 01/25/90       | 12/28/89 | 10  | 2          |
| 02/12/90       | 02/12/90 | 3   | 1          |

\*These are estimated numbers of addresses provided to the contractors prior to the actual delivery of the tapes. Actual numbers of addresses can be found in the text below.

The first tape delivered contained addresses that were obtained from the TAR lists and the APOC operation. The second set of tapes comprised addresses resulting from the 1988 prelist and the APOC reconciliation operation, which were completed earlier than expected, allowing delivery of the first two sets of tapes on October 13, 1989. The short-form tape included over 71.7 million addresses and the long-form tape contained more than 13.7 million long-form addresses in this combined first delivery.

The addresses in the third set of tapes were from the 1989 prelist, which also was completed early, thus allowing these tapes to be available in late December 1989. Because the majority of the DO's were not open at this time, and the MDO's (see ch. 6) did not have storage for update/leave questionnaires, these tapes were held until December 28, when they were released to the contractors. There were over 8 million short-form addresses and 2.1 million long-form addresses in this delivery.

The "late adds" or yellow card adds from the yellow card coding operation made up the addresses contained on the last tapes, which were delivered on schedule (February 12, 1990), although there was a backlog of both short- and long-form addresses that was not processed in time for inclusion. The short-form tape contained 742,528 addresses, while the long-form tape had 129,679 addresses. The estimated 760,000 addresses not processed in time for inclusion on these tapes were listed on a computer printout and sent to the serving DO's, where the mailing packages were hand addressed and mailed.

The short-form initial mailing package assembly began on October 30, 1989, but the long-form assembly did not start until late November 1989, 1 month behind schedule. In addition to this delay, the contractor had startup problems. These problems led to a production deficit that by mid-December indicated that the packages would not be assembled in time to meet the postal dispatching dates. As a result, the GPO issued a formal "cure" notice—a list of issues given in mid-December to the contractor, who was required to remedy the situation within a designated time (30 days) or be declared in default of the contract. Startup and equipment problems were solved and production was back on schedule.

The contractors for the short- and long-form mailing packages, in conjunction with the USPS, developed a plant loading schedule. Both vendors used computer software to carrier-sort the address file. The forms (complete mailers) were packaged in boxes by ZIP Code and carrier route. Boxes for similar three-digit and five-digit ZIP Code areas were placed on pallets and assembled in truckload lots for USPS sectional or bulk mail center destinations. This plan allowed the mailing packages to be sent through the mailstream with a minimum amount of handling.

USPS employees supervised the loading of all trailers which were dispatched for highway or piggyback railroad transport to the destination facility from the following three warehouse facilities:

| Type of form | Contractor's warehouse location | Service area | Number of trailer loads |
|--------------|---------------------------------|--------------|-------------------------|
| Long         | Southern California             | Nationwide   | 152                     |
| Short        | Utah                            | Western U.S. | 148                     |
| Short        | Maryland                        | Eastern U.S. | 162                     |

The USPS used a rail management information system (RMIS) for plant loaders to trace rail trailers dispatched from various plant freight locations to their destinations. USPS personnel entered trailer numbers, rail routing schedules, and dispatch dates. This shipping record was maintained until the trailers reached their final destinations, when data pertaining to their arrival and unloading were entered. In early March 1990, DPLD began tracking rail shipments from the three plant sites using a special computer linkup to the RMIS.

The initial mailing of census questionnaires to the public was set for March 23, 1990. Following consultations with

the USPS, a postal dispatching date of February 1, 1990, was specified in the contracts for the mailing packages. After these contracts were signed and production was underway, the USPS began developing its transportation plans. This led the USPS to change the start of postal dispatching from February 1 until February 26. This 4-week delay caused storage problems because the contractors had timed their production to be completed by February 1 and did not have the facilities to store the huge volume of questionnaires. The contracts were adjusted to allow for the rental of additional warehouse space to accommodate the delayed dispatching. The postal dispatching began on February 26 and was completed by March 17, 1990.

Questionnaires needed for the update/leave operation, to begin on March 5, 1990, were shipped from the contractor's warehouses to the proper DO's between mid-February and March 16, 1990. Advance Census Reports (ACR), Form D-13, which required delivery before the start of the list/enumerate operation (March 26, 1990), were dispatched to the Postal Service on February 26, 1990.

The enumerator-administered questionnaires, forms D-1A and 2A, were printed by June 1989, because they were needed for training kits that were sent to the DO's prior to the operation. The contractors sent all these forms to Census Bureau warehouses in Jeffersonville, IN, from which DPD shipped the kits and stockpiles to the DO's when they opened.

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# SELECTED ABBREVIATIONS AND ACRONYMS USED IN 1990 CENSUS PROMOTIONAL PROGRAM

|       |  |        |  |
|-------|--|--------|--|
| AIAN  | American Indian and Alaska Native                          | ISS    | information services specialist                                |
| AP    | Associated Press   | JSA    | joint statistical agreement                                    |
| API   | Asian and Pacific Islander                                 | LPM    | local public meeting   |
| APSD  | Administrative and Publications Services Division          | LULAC  | League of United Latin American Citizens                       |
| ASD   | Administrative Services Division                           | MALDEF | Mexican American Legal Defense and Education Fund              |
| BCC   | Broadcasters Census Committee                              | MOU    | memorandum of understanding                                    |
| BIDC  | business and industry data center                          | NAACP  | National Association for the Advancement of Colored People     |
| BLK   | Black  | NAB    | National Association of Broadcasters                           |
| CAO   | Congressional Affairs Office                               | NALEO  | National Association of Latino Elected and Appointed Officials |
| CAPP  | Census Awareness and Products Program                      | NCTA   | National Cable Television Association                          |
| CBO   | community-based organization                               | NHSA   | National Head Start Association                                |
| CCAS  | census community awareness specialist                      | NORC   | National Opinion Research Center                               |
| CCC   | complete-count committee                                   | NRFU   | nonresponse followup   |
| CEP   | census education project                                   | NSP    | National Services Program                                      |
| CHIA  | census high interest area                                  | OES    | Outreach Evaluation Survey                                     |
| CPO   | 1990 Census Promotional Office                             | OMB    | Office of Management and Budget                                |
| CSMR  | Center for Survey Methods Research                         | PIO    | Public Information Office                                      |
| DMAP  | Decennial Materials Assembly and Processing Section        | PO     | processing office  |
| DMM's | decision maker meetings                                    | PSA    | public service announcement                                    |
| DO    | district office  | PSD    | Publications Services Division                                 |
| DOD   | Decennial Operations Division                              | RCC    | regional census center   |
| DOM   | district office manager                                    | RCIO   | regional census information officer                            |
| DPD   | Data Preparation Division                                  | RCS    | recruiting coordination staff                                  |
| DPLD  | Decennial Planning Division                                | RD     | regional director  |
| DUSD  | Data User Services Division                                | REOM   | regional elected officials meeting                             |
| FLD   | Field Division   | RO     | regional office  |
| FSCPE | Federal-State Cooperative Program for Population Estimates | SCP    | survey of census participation                                 |
| GPO   | Government Printing Office                                 | SDC    | State data center  |
| GRP   | gross rating point   | STSD   | Statistical Support Division                                   |
| HISP  | Hispanic   | TLP    | tribal liaison program   |
| ISP   | Information Services Program                               | TSCP   | Telephone Survey of Census Participation                       |
|       |  | WYC    | "Were You Counted" Campaign                                    |



# CHAPTER 5.

## Census Promotional Program

### INTRODUCTION

Representatives and direct Taxes shall be apportioned among the several States which may be included within this Union, according to their respective Numbers.... The actual Enumeration shall be made within three Years after the first Meeting of the Congress of the United States, and within every subsequent Term of ten Years, in such Manner as they shall by Law direct. (Constitution of the United States, Article I, Section 2)

The 1990 Decennial Census marked the bicentennial of census taking in this country. Organizing and implementing a successful count required that the Census Bureau mount a multifaceted promotional and outreach program. Similarly, the voluntary participation of the vast majority of Americans was also essential. While past censuses demonstrated that segments of the Nation's population could be uncooperative, they have also shown that one way to encourage cooperation was to foster national awareness of the importance of the census.

For 1990, the Bureau implemented a two-part promotional program that included both publicity through print and electronic media and outreach to selected national, State, and local groups. Publicity involved an intensive media campaign based on a few key messages to raise public awareness of the census, to foster participation, and to educate the public on how to participate. Outreach referred to the identification of important organizations, especially targeting minority populations that have been historically undercounted, to share information about the census, to build a support network, and to encourage participation among their constituents. The 1990 census had a mix of publicity and outreach in all phases of planning and implementation.

The Bureau sought advice from members of minority organizations on questionnaire design and content, recruitment and training, promotion, and format and use of data products. These and other discussions with potential participants and data users collected information that formed the basis for the Bureau's plan for promoting and taking the census.

The primary offices and divisions involved in planning and implementing the 1990 promotional program were the Offices of the Director, the Associate Director for Decennial Census, and the Assistant Director for Decennial Census; the Decennial Planning Division (DPLD), Field Division (FLD), 1990 Census Promotional Office (CPO), Data User

Services Division (DUSD), Congressional Affairs Office (CAO), Public Information Office (PIO), and Administrative and Publications Services Division (APSD).<sup>1</sup> (See fig. 1.)

Although the census promotional program involved the coordination of many offices with distinct functions, the goals for the 1990 promotional program remained the same: To (1) encourage mail response, (2) reduce the differential undercount, and (3) develop a positive atmosphere within which to take the census—people had to be informed that it was important and safe.

The director's office chose Bureau personnel, specifically executive-level staff, to present information about the census at national conferences, meetings, exhibits, activities, and events. Speakers had speech modules and kits to help them prepare their presentations.

In February 1987, the Assistant Director for Decennial Census was delegated responsibility for the 1990 publicity and outreach activities within the Bureau, including the CPO. He oversaw the 1990 census public service advertising campaign developed by the Ogilvy & Mather agency under the auspices of the Advertising Council, and the coordination of regional and local outreach and public relations efforts.

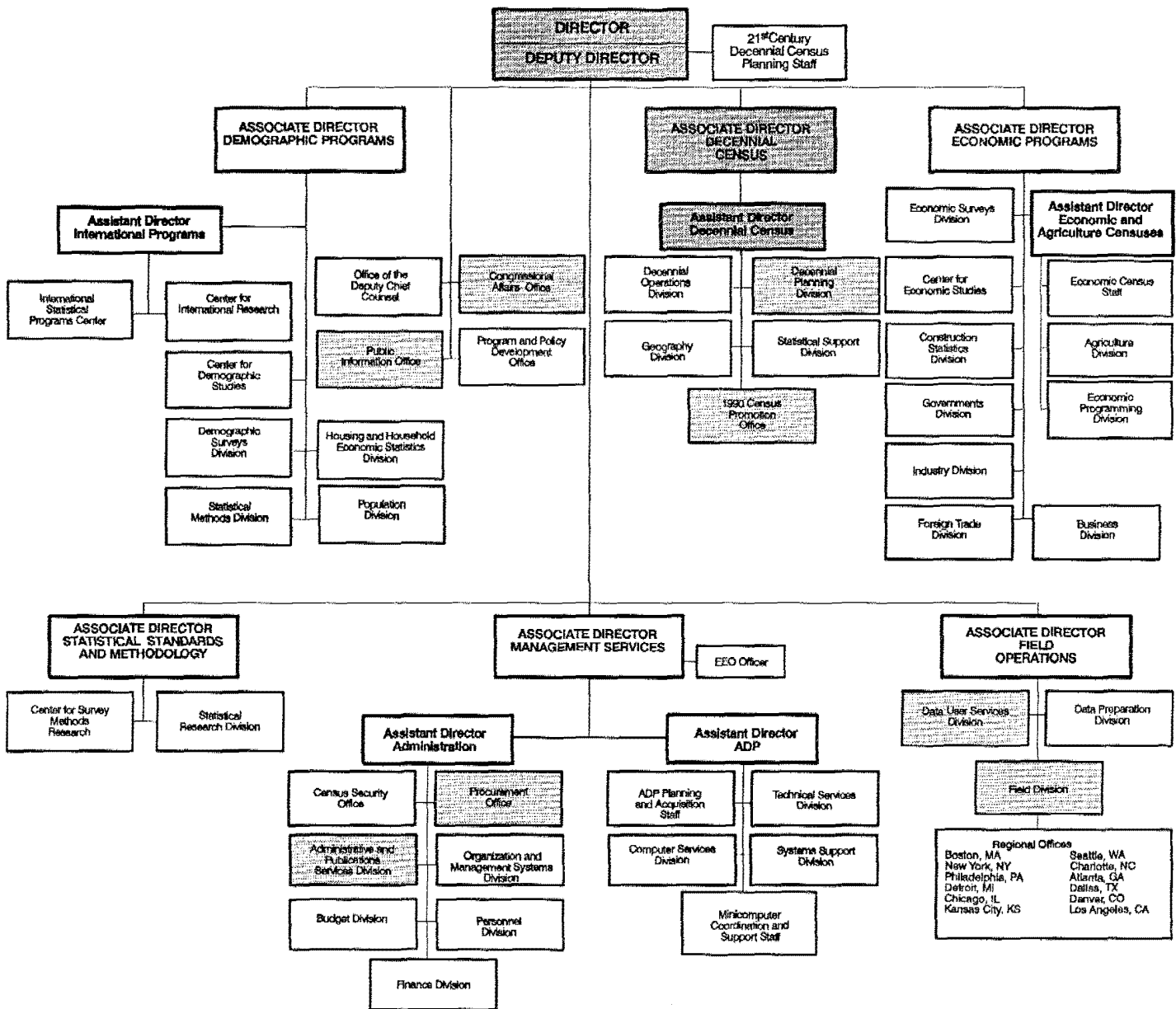
DPLD, in consultation with CPO and other divisions, planned, coordinated, monitored, and implemented promotional and publicity activities, data-user projects, local government involvement, respondent assistance, and other efforts to encourage cooperation.

The Census Awareness and Products Program (CAPP), the FLD's outreach program, supplemented the national outreach campaign in geographic areas and among groups traditionally the most difficult to enumerate, in part by enlisting local community organizations' help. Census community awareness specialists (CCAS's) were assigned to each regional census center (RCC). Each RCC was responsible for data collection, including recruitment and training, as well as for outreach and promotional activities. (See fig. 2.)

CPO mounted a national promotional program by developing informational and instructional materials for the print and electronic media. CPO's Information Services Media Plan sought endorsements by media organizations, such as the National Association of Broadcasters' Census Committee of '90 (BCC '90) program (see p. 26), handled news queries, and issued news and feature releases. The purpose of the BCC was to inform management and interested

<sup>1</sup>The Administrative Services and the Publications Services Divisions merged in February 1990 to form the Administrative and Publications Services Division (APSD).

Figure 1. Offices and Divisions of the Census Bureau Involved in the 1990 Census Promotional Program



Note: Components of the Census Bureau with responsibility for and/or direct participation in 1990 census promotional activities are shaded in grey.

outsiders of the direction and extent of the media program. (See fig. 3, CPO organizational structure.)

The National Services Program (NSP),<sup>2</sup> the State and Regional Programs Staff, and the User Training Branch<sup>3</sup> were the parts of DUSD involved in the 1990 campaign. Staff members (1) spoke at conferences and professional meetings on the Bureau's promotional efforts, its products, and services; (2) assisted State data centers (SDC's),

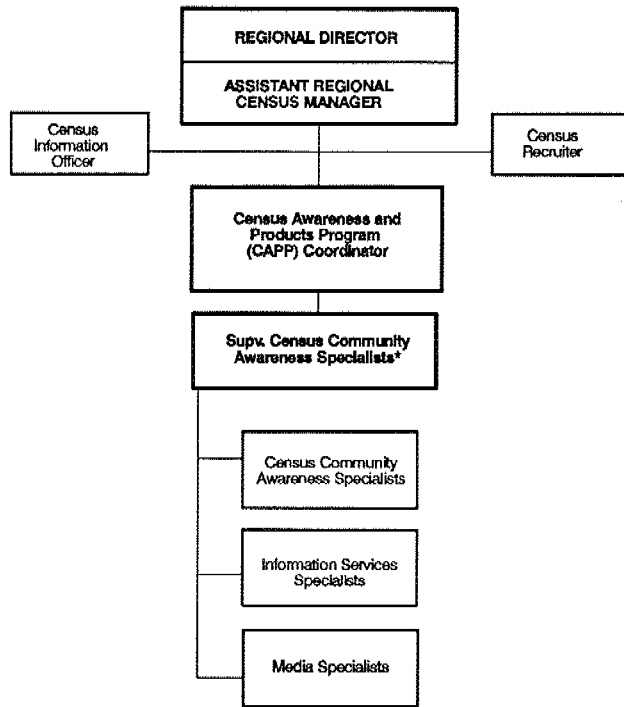
national minority organizations, trade associations, and other intermediaries in providing data services to their constituents; (3) together with DPLD, organized school participation projects; and (4) coordinated Bureau participation at various speaking events and exhibits.

In conjunction with CPO, CAO put together a comprehensive campaign to report to Members of Congress and the media on the progress of the census and to respond to questions as needed. The Bureau sent a letter to each Congressperson soliciting help in promoting the census, briefed Members' press aides on the census and its importance, and provided press kits, sample newspaper columns, speeches, and other material for use in communicating with constituents.

<sup>2</sup>The National Services Program Branch was renamed the National Census Information Center Branch in August 1992. The pre-1992 name will be used throughout this chapter.

<sup>3</sup>The User Training Branch was renamed the Training, Education, and Marketing Branch in August 1992. The pre-1992 name will be used throughout this chapter.

Figure 2. **Organizational Structure of the Census Promotional Program in the Regional Census Centers**



\*One to five specialists in each region were designated as team leaders.

APSD staff designed the covers, title pages, and spines for the major decennial census publications, and developed numerous promotional and educational brochures, folders, and booklets.

The Procurement Office provided contracting services for the Bureau and processed all purchase actions.

### PRELIMINARY PLANNING

In planning the 1990 Census of Population and Housing, the Bureau sought guidance from a broad spectrum of data users, including civic, business, and professional organizations; State planning agencies; national and community minority organizations; Federal agencies; and State and local governments. These provided a very important base for building the kind of community "ownership" of the census necessary for its success.

### Consultation and Contacts With Data Users

**Local Public Meetings (LPM's)**—LPM's were scheduled for each State, with approximately three meetings per month, beginning in April 1984 and concluding in October 1985. These 1-day meetings were designed to solicit comments and suggestions from the public on all phases of the census. Bureau staff members typically made a short presentation on a given topic (population and housing items, and geographic, data-product, and outreach issues) before soliciting reactions from the audience.

These meetings were cosponsored by local groups (such as chambers of commerce, minority group organizations, and SDC's) and promoted through local media in an effort to get interested parties to attend. DUSD was the coordinating division.

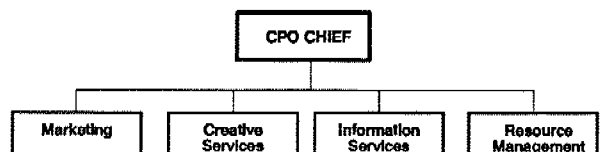
The meeting organizers/cosponsors were responsible for local publicity, and it was suggested that local press releases be used to encourage meeting attendance. A national press release early in 1984 went to national public interest groups such as the National League of Cities, the U.S. Conference of Mayors, and so forth, for inclusion in their newsletters.

**Conferences and Meetings**—To plan an operation as large as the census required consultation on many distinct topics. Some of these fit neatly into the scope of advisory committee meetings or other existing forums; however, others required bringing a group of experts together for a one-time meeting or conference. In addition to the LPM's, the following meetings (see ch. 2 for details) were instrumental in the development of the 1990 promotional campaign:

- Federal Agency Council meetings (November 1984-July 1985)
- Joint Meeting with Minority Groups (January 8 -10, 1984)
- Census community meetings (September 11-December 9, 1986)
- Cities and 1990 Census Planning Conference (June 1-6, 1986)
- Planning Conference on Census Education Project (July 23-25, 1985)
- Planning Conference on Outreach (September 24-26, 1984)
- Decennial Census Decision Conference (October 1985)
- National Conference of Catholic Bishops (November 1988)

Keeping in mind the 1980 experience and the goals of the census, recommendations made at the meetings referring to promotion included the continuation of such outreach programs and projects as the school project, complete count committees (CCC's), SDC's, CAPP, and the religious project.

Figure 3. **1990 Census Promotional Office Organization**



Regarding specific populations, attendees suggested more outreach to minorities by hiring more bilingual enumerators, using more publicity materials in different languages, developing publicity campaigns geared to these populations, and improving communication among the American Indian community through the Tribal Liaison Program (see p. 38). Although at times there were inconsistencies in the methods proposed for publicizing the census, there was a consensus that public cooperation was to be attained through an educational process. Lack of understanding of the purpose of the census was cited as a major hindrance. To rectify this problem, attendees suggested that the Bureau prepare justifications of each question, such as who used the data and for what purpose, and include the strongest justifications with the questionnaire. Many users strongly recommended that the Bureau stress confidentiality, particularly of financial information, and offer specific examples of where it had defended the privacy of responses.

While attendees agreed that much publicity was needed, there was no consensus on what type of message would produce the best response. To make this determination, the Advertising Council (which had worked with the Census Bureau in the past and was actively involved in the census process early in the 1990 census cycle) and the Bureau separately researched the effects of various types of messages for different population groups. For the first time, market segmentation was tried. The Bureau also considered most forms of mass media, including films and video cassettes, as vehicles for census messages, along with such alternatives as talk shows, call-in programs, and an hour-long prime-time broadcast.

**1990 Census Advisory Committees**—On May 21, 1985, the Department of Commerce's Assistant Secretary for Administration chartered four public advisory committees specifically for the 1990 census. There was one each for the American Indian and Alaska Native (AIAN), Asian and Pacific Islander (API), Black (BLK), and Hispanic (HISP) populations; the first was new for 1990, and the other three were reestablished from 1980. These committees provided an organized and continuing channel of communications between their respective communities and the Bureau on the problems and opportunities of the 1990 census.

Each committee had a maximum of nine members. They met at least once and usually twice yearly; DPLD coordinated their operations.

**Regional Indian Meetings**—DPLD also coordinated two rounds of regional meetings (May 1985-September 1986 and November 1988-May 1989) with American Indians and Alaska Natives to inform them about census plans and obtain direct advice from tribal governments on local situations and unique needs. The first round focused on sharing the Bureau's plans and receiving suggestions on all aspects of the census for AIAN's, while the AIAN Advisory Committee addressed an identical spectrum of issues. The second round provided more definite plans for

enumerating American Indians and Alaska Natives and gathered momentum for support in the promotional efforts. (For more detail, see ch. 2.)

**1990 Census Outreach Planning Committee**—In January 1983, this committee, one of DPLD's 17 planning groups representing a cross-section of the Bureau's organizational units, was established to identify issues related to outreach, define and collect information on each of them, and develop recommendations or general plans to address each issue. This included reviewing 1980 experiences and seeing that these were properly documented as a basis for 1990 planning. Members met monthly and exchanged information with the other groups. Among the Committee's recommendations were the following:

- To develop a pro bono public service campaign and other promotional efforts with the Advertising Council.
- To establish a group of minority advisory committees, plan and conduct a series of regional Indian meetings, and hold ad hoc meetings with other groups.
- To reestablish an advisory committee on housing.
- To create an outreach subcommittee in the Federal Agency Council (representatives of Federal departments and agencies who advised the Census Bureau on their census data needs; for more information on this group, see ch. 2) to make use of the expertise and outreach resources already existing in Federal agencies.
- To fashion an in-house program for census employees to increase their knowledge of and support for the decennial census and use them as potential spokespersons on behalf of the Bureau.

The group disbanded in November 1983; its final report was released a month later.<sup>4</sup>

**Public Relations Council**—This council, headed by the Assistant Director for Decennial Census, assured good communications among its representatives, who were from the Outreach and Coordination Branch in DPLD; PIO; CPO; DUSD; the Redistricting Data Staff; FLD; CAO; and the Government, Commerce, and Civic Relations Staff in the Office of the Associate Director for Field Operations. The exchange of information about various outreach, promotional, and public relations functions was meant to increase cooperation and minimize overlap or possible confusion. The group met biweekly to identify, discuss, and resolve any conflicts, and to disseminate the same information to all represented units. Meetings began in July 1986 and ended in December 1987.

**American Indian and Alaska Native Task Force**—Established by DPLD in 1987, the American Indian and Alaska Native Task Force, chaired by the Population Division, created and refined programs and products from the 1990

<sup>4</sup>1990 Decennial Census, Informational Memorandum No. 18, "1990 Outreach Planning Committee Final Report," Dec. 21, 1983.

census for AIAN governments, organizations, and communities. The task force, composed of six AIAN Bureau employees, served as the formal entity where divisions, branches, or individuals received advice and/or recommendations on programs and products they were developing for the AIAN population. The task force's primary work involved outreach programs and promotional materials. Although the task force was involved in all phases of the census process, it—

- Reviewed FLD-CAPP's tribal and village liaison programs (see p. 38 ) and was involved in the development of their resource and training materials.
- Devised the overall theme "Listen to the Drum" for the 1990 census used by the Institute of American Indian Arts in the PSA's, videos, posters, and other material.
- Consulted on the AIAN *Urban Action Guide* and the booklet, *1990 Census Program for American Indians and Alaska Natives*.

**1990 Promotional Coordination Committee**—In February 1988, DPLD established this forum for addressing the promotional program issues as the Bureau moved from planning to implementation. Thus this committee raised, resolved, or made recommendations concerning issues related to promotional, recruitment, and training materials, objectives, and/or implementation of the various components of the promotional program.

**Outreach Committees**—From 1985 to 1990, outreach committees met periodically to coordinate, develop, monitor, and assess current plans and operations for each test census and the dress rehearsal. Attendance occasionally included Bureau personnel with specific knowledge of promotion. The committees lasted approximately 1 year, meeting biweekly (and sometimes weekly depending on the committees' needs.) DPLD's Project Coordination Branch had overall responsibility for scheduling, agendas, and issuing official meeting reports. The 1986 Outreach Committee, for example, met biweekly and was comprised of staff from Administrative Services Division (ASD), FLD, PSD, DUSD, DOD, PIO, and the Director's area. Its first meeting was on July 17, 1985.

**External Affairs Committee**—This information and coordination committee consisted of the director and executive staff (or their representatives), and the chiefs of DUSD, PIO, and CAO. They met weekly during the period preceding and continuing beyond the census, and briefed each other on what they and their respective units were doing in public relations outside the Bureau. Meetings began in September 1986 and ended in December 1993.

**Commerce Committee on the 1990 Census**—In 1983, the Department of Commerce formed this committee, chaired by the Undersecretary for Economic Affairs and composed of a number of top Department officials as well as the Census Bureau director and other senior staff members. Among its stated purposes were anticipating

problems, providing continuity at the Department level where budgets and requests for procurement (computers, for example) had to be considered, and coordinating the Bureau's efforts in outreach and obtaining public cooperation. The committee met in May, September, and October 1983, March 1984, and quarterly thereafter through 1991. Bureau officials presented reports on the progress of planning, and there were special discussions of pretest plans, automation, and outreach.

## Test Censuses and Dress Rehearsal

Formal planning for the 1990 census began in 1983. The 1988 dress rehearsal was the culmination of the Bureau's planning efforts and was preceded by 5 years of consultations with different groups of data users and formal tests of alternative procedures and questionnaire content. (See ch. 2 for details.) There were more major tests for the 1990 census than for previous decennial censuses (seven for 1990 vs. five for 1980).

The early start to planning permitted the Bureau to begin major testing earlier for 1990 than had been possible for 1980 (1984 vs. 1976). These tests were instrumental in the final 1990 promotional program.

**1985 Test Censuses**—The promotional and outreach program for the 1985 test censuses in Tampa, FL, and Jersey City, NJ, was a combination of activities coordinated by DPLD and developed and implemented by PIO, FLD, and DUSD. Since improving the outreach and promotional programs was not among the 1985 test censuses' goals, 1980 techniques were repeated. The level of direct support and involvement by headquarters and the regions compensated somewhat for the lack of a national promotional campaign and national interest in the census. The Bureau wrote public service announcements (PSA's) for the complete count committees (CCC's) in New Jersey and in Tampa, and it paid for the production of PSA's in Tampa since the contract offers were small and attracted no bidders.

The Bureau and community-based, religious, and minority organizations in each of the two sites cooperated on activities which usually focused on the hard-to-enumerate areas.

Headquarters staff directed the promotional efforts and the FLD division implemented them. These involved contacting the media (television, radio, and newspapers); producing recruiting or other materials such as posters, post cards, handbills, and PSA's (in both English and Spanish); compiling information kits; presenting text/speech and slide shows clarifying census issues (key census dates, census confidentiality requirements, etc.); and providing materials for the Census Sabbath Project to support the census on Sunday, March 24 (Census Day). Most materials came from headquarters, but on occasion staff at each site designed and produced their own.

In addition, DPLD's/DUSD's 1990 Census Education Project created two lessons. Over 90,000 students in both Jersey City and Tampa schools used one of the two, and

their teachers received a guide to help them incorporate the lessons into the curriculum. Separately, in July 1985, the Bureau held a project planning conference—32 educators from around the country representing a cross-section of education, geographic locations, population sizes, and minority concerns. They provided project definition, product guidelines, time schedules, distribution, and promotional suggestions.

Finally, a “Countdown to Census Day” open house was held in the two sites. After Census Day, there was a “Were You Counted” (WYC) campaign, with forms in local newspapers, distribution at targeted sites, and reproduction proofs for CCC use. The 1985 campaign began in October 1984 and ended in March 1985.

Focus group research in the 1985 tests assessed the differential effect of the optical mark reader questionnaire and evaluated the effectiveness of the outreach/publicity program. Concerning efforts to increase public awareness, focus group members felt the Bureau should: (a) emphasize messages on census content, purpose, and meaning; (b) stress mandatory response and the potential for personal visits; (c) research motives and incentives for responding; and, (d) add more respondent education on census confidentiality and purpose.

**1986 Test Censuses**—These, in Los Angeles County, CA, and east central Mississippi, were the first to include specific 1990 outreach test objectives. Keeping in mind the absence of the Advertising Council, the goals were to—

- Construct a public service advertising campaign, using the services of contractors (CDR-Consulting Productions for creative work and Forte Enterprises for production work) to produce radio, TV, print, and outdoor advertising.
- Test some of the possible uses of cable TV for publicizing the census.
- Survey expected hard-to-enumerate groups to determine the “messages” likely to be most effective in gaining cooperation, and incorporate these messages into the promotional effort.
- Make extensive use of classified ads in the recruitment campaign, especially in minority and neighborhood publications.
- Test a census awareness campaign aimed specifically at local community organizations and other local neighborhood opinion makers.
- Test the use of census teaching materials as a way to help promote the census.
- Develop an awareness campaign oriented toward religious organizations.
- Increase the assistance contributed by State and local governments to the census promotional effort. Government involvement included the Mississippi Choctaw Indian Tribal Council, SDC’s, and executive briefings to begin outreach activities.

- Design a management structure that provided concerted, consistent outreach among the various organizations involved (i.e., collection office manager, the CAPP and the regional director; PIO, FLD, and other headquarters divisions and officials; and the media, advertising agencies, and others with an interest in the total outreach effort).

Some of the planned outreach and publicity activities were designed solely to support the 1986 tests and were not considered prototypical for 1990 (e.g., the level of headquarters involvement in the open houses was not something anticipated in 1990). Such activities were not evaluated; others in which the Bureau expected to learn something for use in designing the 1990 programs were.

The FLD implemented the outreach activities through its CAPP staff. For each test site, the FLD assigned one census community awareness specialist (CCAS) and one information services specialist (ISS).

CAPP involvement was in four stages: In the first stage, from November to December 1985, the CCAS’s and their ISS counterparts familiarized themselves with their sites. Overlapping this was stage 2, from October to December, which focused on “building an outreach base.” This meant establishing community networks, arranging meetings to introduce CAPP personnel to community leaders, and forming CCC’s. Stage 3 ran from January 1986 to Census Day, April 1. Here, CCAS’s motivated leaders to spread census messages and expand awareness and education. Stage 4 was devoted to the “It’s Not Too Late” campaign.

The 1986 test in Los Angeles included the first CAPP trial. Its six-part evaluation looked at the extent to which census messages disseminated through CAPP’s nontraditional channels actually and potentially affected the willingness of target populations to cooperate with the census, as evidenced by mail returns. The evaluation sought information from all “participants” in the CAPP effort—census area residents, local community group leaders, and Bureau staff—through a post-census household sample survey, focus groups, a survey of leaders of community organizations, and structured debriefings of the CCAS’s. Results indicated that the overall outreach effort in Los Angeles was not very effective. (Only about 40 percent of survey respondents said that they had seen or heard anything about the census there.) The lack of success did not necessarily indicate that CAPP was not viable; rather, it could be attributed to a less-than-optimal setting for outreach in general (i.e., a test census in only part of a media market), operational malfunctions associated with the test census setting, and the anticipated difficulties in executing a time- and effort-intensive program for the first time.

Using the results of the 1985 school project evaluation and the recommendations and suggestions from the 1990 School Project Conference (see ch. 2), the Bureau constructed a classroom educational/promotional project that involved students and their parents. Staff discussed the project with State and local education officials in both test sites. While the Bureau provided project direction, the



content and material design was a cooperative effort with representatives from the Population Reference Bureau, the Urban Life Population Education Institute, and teachers and administrators from the 1986 test census States and sites. A standardized package of reusable teaching materials for grades K-12 in Mississippi and California site schools contained a cover letter; an announcement poster; a census product resource listing; background information on the test censuses; census history; a series of lessons/activities devoted to primary, intermediate, and upper grades; a summary of 1980 U.S., California, Mississippi, and test site data; a U.S. data map; take-home census announcements; and a teacher's guide.

Distribution of these packages was on a school-by-school basis. One package was sent to each principal (or similar school administrator) and one to each district superintendent. The lessons, data summary, data map, and teacher's guide were camera-ready reproducibles for internal distribution to teachers and students. Letters notifying administrators of delivery were sent in advance and announcements were also printed in teacher newsletters.

(Recommendations from the 1985 test and from the planning conference in July of the same year (see ch. 2) resulted in two pilot packages for the 1986 and 1987 tests. These packages were formally and informally evaluated for content, usefulness, adaptability, etc. Beside using it in the test census areas, the Bureau tried the 1987 kit in several school districts outside. During August 1987, the Bureau brought together the final 1990 kit development team. They went through everything that had been done to date, examined the evaluation materials, and revised the kit and its contents.)

Since some churches and other religious organizations had effective outreach systems, the CCAS's used them as another community vehicle for census promotion. They urged local churches to issue letters to individual congregations asking for their cooperation. Individual churches were a natural component of community networks. Examples of the kinds of assistance they provided were (1) publicity through their bulletins and other media, (2) printing and/or distributing precensus promotional materials, (3) providing space for testing, training, and questionnaire assistance, and (4) acting as sources of recruitment for enumerators and other workers.

At the State and local government level, the Bureau requested the highest elected officials of selected jurisdictions in the test sites to establish complete-count committees (CCC's), each comprised of a broad cross-section of representatives from the community and reflecting different attitudes and interests. The CCC members were elected officials, religious and community leaders, business persons, local media representatives, educators, etc.

In the Mississippi area, it was suggested that the committees be county based, to concentrate on community efforts. There was a separate committee for the Mississippi Choctaw reservation and trust lands. In the Los Angeles County area, the committees were designated for places, or where appropriate, combinations of places.

The kinds of activities the Bureau asked these committees to undertake between October 1985 and August 1986 included, but were not restricted to, the following:

- Periodically mail census information to a large number of community and civic organizations and leaders to make them aware of the census.
- Produce local promotional materials to complement and supplement census materials, including localized PSA's and appearances on television and radio talk shows.
- Involve appropriate agencies in the outreach program.
- Organize special events at which messages concerning the census would be presented.
- Help designate and set up assistance centers.
- Assist in identifying agencies that could help with foreign language translations.
- Assist in recruitment efforts by providing testing areas, sources of recruits, and speakers.

The Bureau involved SDC's and appropriate affiliates for the first time in several outreach activities: They served as a primary source of contact with persons and agencies useful in outreach or with local knowledge for identifying hard-to-enumerate areas, and in starting CCC's (i.e., by suggesting potential members).

To the extent that religious groups were treated as community-based organizations, they were covered in the CAPP test evaluation. However, the Bureau wanted to determine how effective the "Census Sunday" activity was (i.e., dissemination of census messages by religious leaders and organizations on the Sunday closest to Census Day). The staff surveyed religious leaders in both sites: Did they participate, and if so, in what manner? How were the messages received? Were foreign language materials used? Were there any negative reactions? Were there any suggestions for improvement? Given that the 1990 census would be on a Sunday, this opportunity to gain a significantly large audience for census messages was carefully planned.

An additional testing impetus for the rural area was to evaluate improved techniques for enumerating American Indian reservations. One of these was the implementation of the Tribal Liaison Program (see p. 37). The purpose here was to improve working relationships between the Census Bureau and the tribal government through the use of liaisons. These were people appointed by tribal leaders to work with the local census office on such activities as outreach and enumerator recruitment. The program was to establish effective working relationships with the tribe for enlisting its members' cooperation, recruiting applicants from the reservation for all levels of jobs, clarifying or translating during training sessions, and serving as the local-review contact for the tribe. Evaluation of the program



showed that it was effective and that certain improvements such as a manual and training materials in future tests would make it even more useful.

**1987 Test Census**—For the 1987 test in north central North Dakota, the regional office (RO) hired and trained one CAPP employee. He obtained listings of local groups and /or organizations and identified their structure and the leaders who served the program target areas such as: civic, religious, fraternal, educational, social service, and housing groups, organizations, and leaders. Media outlets, both print and electronic, especially minority and non-English outlets, were also noted.

The CAPP staff reviewed/compiled information such as demographic and economic profiles and forms of local government in order to develop familiarity with program target areas. They also prepared specifications, manuals, training, and forms for use by people assigned to the dress rehearsal (see below), including managers and supervisors.

**1988 Dress Rehearsal**—The dress rehearsal for the 1990 census took place in 1988 in St. Louis city and 14 counties in east central Missouri, and 8 counties and 2 American Indian reservations in eastern Washington State. (See ch. 2 for details.) The 1988 promotional program's objective was to increase public awareness about the census and to encourage public support and complete participation in the census by the entire population. The program consisted of two major components: a publicity campaign designed for the general population and an outreach campaign designed primarily for hard-to-enumerate populations. Implementation was in five phases:

Precensus (Oct. 15, 1987-Mar. 10, 1988) publicized census benefits, Census Day, the census area, enumeration methodology, confidentiality, expected arrival of questionnaires, and general census operations. Activities and materials included the Private Sector Project,<sup>5</sup> SDC Project and Guide, Ad Council advertising campaign, Census Education Kit, *Census Community Action Guide*, Early Alert minority motivational message flyer, *Local Government Promotional Handbook*, *Tribal Liaison Resource Handbook*, Head Start Program poster and flyer, recruitment materials, and census messages for religious organizations.

Census week (Mar. 11-20, 1988) promoted the mailback of questionnaires and publicized the availability of questionnaire assistance, much the same as in phase 1, but with added activities and materials.

"There's Still Time" (Mar. 21-Apr. 22, 1988) was a mail reminder postcard that informed residents that they still had time to complete their questionnaire and mail it back or hold it until an enumerator came to pick it up.

<sup>5</sup>The 1990 marketing program had its genesis in a "Private Sector Initiatives" project, a successful promotional vehicle for the 1988 dress rehearsal of St. Louis city and east central Missouri, in which Civic Progress, Inc., a consortium of 30 "Fortune 500" corporations and companies, volunteered their extensive communications resources to supplement the Census Bureau's own promotion effort.

Nonresponse followup (Apr. 25-May 27, 1988) promoted public cooperation with enumerators in the area through flyers, recruitment materials, and print and broadcast news releases.

"Were You Counted" (WYC) (May 28-June 30, 1988), gave people who believed they were missed by the census one more opportunity to be counted. Materials included WYC forms, letters to editors, and news releases.

The outreach campaign under the CAPP "umbrella" covered such things as community networks, the religious organization project, media activities, complete-count programs, SDC's and affiliates, the school project (the kit was further revised one last time before it was released in January 1989), and tribal liaison activities.

One dress rehearsal purpose was, as noted, to test all 1990 census promotional and outreach plans. This included the Advertising Council's campaign. The Ad Council hired the Gallup Organization Inc. to evaluate the 1988 publicity. The study tracked census awareness, knowledge, attitudes, and behavior in conjunction with the advertising campaign as implemented by the Ad Council at the two Missouri dress rehearsal sites, and qualitatively assessed the specific advertisements used in the campaign. Following is a summary of the major findings:

- Census awareness increased significantly over the course of the ad campaign.
- Accurate knowledge about the census and positive attitudes towards it also increased significantly over the campaign—specifically with respect to the key issues of confidentiality and the legal requirement for census participation.
- The changes in awareness, knowledge, and attitudes occurred across the board for all important population subgroups.
- Reported census participation was enhanced for respondents with high levels of knowledge about the census, particularly among Blacks, although holding positive attitudes towards the census did not appear consistently to enhance participation.
- The combination of the advertising and other sources of public information produced positive changes in awareness of the census that, in turn, enhanced cooperation.
- Finally, the campaign appeared to be effective in implanting a concrete, lasting message among many of those who saw or heard it. (See the Gallup Organization Inc. *Census Awareness Evaluation*, 1988).

## **PUBLICITY—PROMOTION**

### **National Advertising Campaign**

Following the 1980 census, the Bureau commissioned a detailed report on the promotional campaign with particular emphasis on the activities of the CPO and the Advertising (Ad) Council. This study recommended that planning for

1990 census promotion should begin in 1985 with the hiring of the CPO chief and a secretary. The new chief would devote approximately 2 years to studying past records, learning about Bureau operations, developing outreach and promotional plans, preparing training materials, identifying candidates for staff positions, and assisting the Bureau director and the Secretary of Commerce with their proposals to the Ad Council. Hiring for staff positions should begin in 1988. Other recommendations urged the Bureau to:

- capitalize on the director's leadership of, and commitment to, the overall promotional effort
- hire and train talented promotional experts
- identify and target key population segments and develop appropriate promotional campaigns for each segment
- continue to rely on "pro bono" (i.e., free, public-service) rather than paid advertising
- recruit broadcasters willing to contribute free or low-cost air time
- devise and carry out research projects to help construct and evaluate promotional programs
- devote special attention to particular audiences, such as members of Congress and Spanish-speaking people
- conduct a school project, but only if sufficient time and funds are available
- ensure greater coordination of outreach and promotion within the Bureau.<sup>6</sup>

Toward the end of 1985, the Bureau submitted to the Department of Commerce a reorganization plan that included the establishment of the 1990 Census Promotional Office (CPO). The plan was approved just over a year later, and the CPO was founded in January 1987. During a national search for a chief (selected in March 1988), the Assistant Director for Decennial Census took on the task of setting up and managing the CPO. He organized a skeleton staff, drawn mainly from Bureau personnel (especially from the Public Information Office), but refrained from hiring the full CPO complement because of the desirability of allowing the CPO chief (once named) to select his or her own staff.

The Bureau's report on 1980 census promotion also stressed the importance of the director's ongoing and visible leadership. Both of the Bureau's directors during the 1984-92 period came from marketing backgrounds, agreed on the contribution a well-organized and executed promotional campaign could make to the 1990 census, and played significant leadership roles in the Bureau's promotional efforts. During the 10-month hiatus between the resignation of one director (January 1989) and the appointment of his successor (November 1989), the Associate

Under Secretary for Economic Affairs (Department of Commerce) filled the director's usual leadership and coordinating role with respect to promotion. The CPO chief provided day-to-day supervision; the Assistant Director for Decennial Census exercised overall responsibility for census promotion and worked directly with the Associate Under Secretary.

Traditionally, the census had experienced great difficulty in accurately counting some minority groups. Thus for 1990, it emphasized field outreach activities and more extensive targeting of public-service advertising to reach minority populations.

CAPP was administered through a temporary outreach staff of 260 (compared with 200 in 1980) in census field offices. This program was the costliest part of the promotional effort. Peak outreach staffing occurred about 6 months earlier than in the 1980 census when, according to a Bureau evaluation, the staff had been unable to effectively fulfill their assignments as a result of their short tenure.

The Advertising Council's work for 1990, which started over a year earlier than for 1980, also focused more attention on minority populations. To do this the Ad Council recruited four minority advertising firms (see p. 12).

The Bureau's FY 1990 budget alone had \$27.5 million for outreach and publicity, including CAPP, CPO and its activities, the school project, NSP, the advertising campaign, and the Census Advisory Committees. The total decennial cycle cost for promotion and outreach was \$72.7 million. This was 2.9 percent of the total cost for the 1990 census (\$2.5 billion).<sup>7</sup>

### Public Service Advertising for the General Population

In every census since 1950, the census advertising program had been supported by the Ad Council. Its level of support increased with each decade, and in 1980 it was widely credited as having added materially to the success of the census. In 1990, the volunteer advertising agency (Ogilvy & Mather International, Inc.), with 73 staffers, contributed more than 3,800 hours. Their creative talents, plus the Ad Council's effort, produced the equivalent of \$38 million in time and space donated by the Nation's media.

Ogilvy & Mather's general campaign focused on building awareness and reinforcing positive predispositions to answering the census. It was targeted to that segment of the general population most likely to return their census forms voluntarily. Highlighting community benefits derived from the census, the messages stressed "what's in it for you." The campaign, relying on a thematic device—how individuals contributed to the building of the whole—carried through images of match sticks and beans as the basis for counting and evolving into tangible benefits.

<sup>7</sup>Promotion and outreach included all activities related to user and stakeholder education, participation, and input into awareness of the census program. Major subcomponents were the Census Promotional Office, the Advertising Council, and the Census Awareness and Products Program.

<sup>6</sup>U.S. Bureau of the Census. *1980 Census Promotion Program Procedures, Results and Recommendations*. H. Naylor Fitzhugh, comp. Washington, DC. 1981.

The 1990 general program used established advertising channels of communication to reach the entire public through a national television, radio, and print package with the following messages:

- A census of population and housing will be taken beginning April 1, 1990.
- Census results can benefit all residents and their communities.
- The decennial census is a nationwide community event with a 200-year history.
- Fill out the census questionnaire completely and mail it back promptly.
- The Census Bureau is legally committed to maintaining the confidentiality of personal data.
- Temporary census jobs are available in many locations; here is how to apply.
- Cooperate with census takers who may visit households.

As part of the CPO support, the Ad Council also designed a 1990 logotype for publications, exhibits, and audiovisuals. The logo symbolized the Bureau's mission—to serve the people by gathering facts they could use to shape their lives.

(The 1990 logotype, based on the logo design, depicted two faces in profile formed from concentric circles. The two profiles, created by the varying widths of these circles, emerged as one was looking left, to the past, and one was looking right, into the future. Typography unique to the 1990 Decennial Census of Population and Housing appeared above the logo, and the advertising slogan appeared below.)

Figure 4. 1990 Census Logo



The Ad Council researched public attitudes about the census to better shape the public-service advertising campaign. This included special efforts aimed at “hard to enumerate” groups, including minorities, the elderly, and the functionally illiterate. The findings from this research, matched with the results of similar investigation during test censuses to check the effectiveness of census messages among various segments of the population, determined the

media preferences of these groups, the languages other than English needed to reach them, attitudes about the census, and how to establish the most effective creative copy approach.

### Minority Media Campaigns

**Advertising Council**—Historically, some subpopulations have been more difficult to enumerate than others. For example, while the overall undercount among the Black community steadily decreased between 1940 and 1980, the differential undercount between the White and Black populations remained. One of the primary goals of the 1990 census was to reduce any differential undercount for various racial/ethnic populations; one way was to enhance the participation levels of individual subpopulations.

In 1980, only one advertising firm was involved, and the campaign theme was singular, designed to appeal to wide-ranging audiences. In 1990, for the first time, the Ad Council used the services of four minority advertising agencies—Mingo Group (BLK), Castor Spanish International (HISP), Muse, Cordero, Chen, Inc. (API), and West Indies and Grey (Puerto Rico). The Institute of American Indian Arts fashioned promotional materials specifically for American Indian tribes, Alaska Native villages and regional corporations, national Indian organizations, Government agencies, State Indian affairs commissions, Indian schools, religious organizations that had Indian outreach, urban Indian centers, and national AIAN electronic and print media.

Each agency and organization created a slogan to be used in videos, PSA's, flyers, posters, buttons, etc., for use in minority communities, such as the following:

- Listen to the Drum (AIAN).
- Answer the Census. It Counts for More Than You Think (General).
- Stand Right Up for Who You Are. Answer The Census (BLK).
- ¡Esta es la Nuestra! Participe en el censo. (HISP—Spanish version); This is our chance! Answer the census. (HISP—English version).
- Any Way We Add It — It Makes Good Sense to Answer the Census (API).
- Censo '90. Abre tus puertas a un futuro mejor (Puerto Rico—Spanish version); Census '90. Open your doors to a better future. (Puerto Rico—English version).

The Mingo Group's campaign primarily targeted low-income Black populations. These were individuals who represented part of the traditionally undercounted populations in past censuses. The television and radio campaign included a spot featuring Al Green, updated and softened from the one used in the St. Louis dress rehearsal, and to provide balance, a more “middle of the road” spot focusing on family and community benefits. The TV campaign included “open donut” versions (containing 15-second

blank spaces for local adaptation). The radio and TV advertising emphasized music as a medium and focused on self-identification and the confidentiality of answering the census.

Castor Spanish International's campaign primarily targeted the low-income Hispanic population with images that reflected integration into the United States. Advertising focused on themes of self identification and group affiliation. Presented in English and Spanish, television and radio materials used Mexican, Cuban, and Puerto Rican dialects and distinctive cultural scenes to stress family and community benefits.

Muse Cordero Chen, Inc., created its campaign to reach the low-income Asian populations. Due to the Asian immigrants' heavy dependency on native languages, much of the advertising appeared in a variety of these—Chinese, Japanese, Korean, Vietnamese—plus English. The TV package had a video and music-only version, and a similar version without a language-specific tag line at the close, to permit adaptation in other languages if needed. The campaign emphasized each person's civic responsibility to answer the census and used an abacus, an object familiar to all Asian segments, as the thematic approach throughout print and broadcast advertising.

The Puerto Rico promotional campaign (described in ch. 13) was the first of its kind established to overcome differences between the mainland and Puerto Rico. Variations in census methodology, geographical separation, language, and other cultural differences there would have limited the effectiveness of the promotional program designed for the general or Hispanic population on the mainland.

American Indians and Alaska Natives, from hundreds of separate tribes, lived on reservations and in urban and rural areas from Florida to Alaska, but shared ways to communicate through art. The Institute of American Indian Arts developed promotions, advised the Bureau on strategies to reach American Indians and Alaska Natives, and created a variety of communications materials to inform and motivate this audience to answer the census: a video PSA, live-copy PSA scripts and drama/ story-telling scripts for radio, flyers, posters, buttons, a video docudrama, and a reproducible art package.

**CPO Campaigns**—To minimize duplication of effort among all involved—CPO, other Bureau divisions, contractors, and the Ad Council—CPO took on the role of consultant and itself planned and carried out specific campaigns aimed at the minority media. CPO Information Services had promotion specialists at headquarters for the Hispanic and Black media and a media outreach coordinator in the regional census center in Seattle for American Indians/Alaska Natives (AIAN). A specialist in CPO's marketing unit handled API relations. To a much greater degree than with the general media, these people made on-site contacts and were directly involved in the various media organizations' specific promotions. There were minority-oriented conventions, news releases, mailing lists, etc. All of this was in conjunction with the strategy of extensive appeals for

"third-party validation" endorsements of the census and calls for cooperation emanating from credible sources other than the Bureau.

The Hispanic specialist worked on a continuing basis with all major Hispanic media organizations. He provided Bureau support and coordination for a variety of promotional activities, illustrated by the following Hispanic media organizations which received special director's awards for their contribution to the promotion of the 1990 census:

Spanish television networks such as Telemundo, Univision, and SIS (Spanish Information Services) recorded PSA's with every personality that visited any of their affiliates across the country and featured CPO-produced news releases. Telemundo cosponsored with Procter & Gamble a "Census '90 Concert" with major music personalities and a stage dedicated entirely to "Censo '90." Univision conducted its campaign jointly with the Mexican American Legal Defense and Education Fund (MALDEF) "Hágase Contar" project. Finally, these networks jointly "blocked out" time and aired a special program that simultaneously relayed a message of importance to the entire U.S. Hispanic community.

Cadena Radio Centro, a network of some 26 Spanish radio stations in top Hispanic markets, carried a series of one-on-one interviews with census officials and made census education pieces part of their daily news features early in the critical education and awareness phase of the campaign.

The National Association of Hispanic Publications (NAHP) endorsed the census and encouraged its 200-member, Hispanic-owned and Spanish-language daily, weekly, and biweekly publications, to carry census editorials, PSA's, news, and feature stories. Under a grant from Philip Morris, Inc., NAHP mounted a print advertising campaign to support the MALDEF "Hágase Contar" project.

The Black/African American media went to extraordinary lengths to convey the urgency of the 1990 census message to their audiences. Their commitment represented an investment of considerable time, money, and effort. Several organizations stood out for their contributions. The Johnson Publishing Company, Inc. not only published a cover article in its *Jet* magazine and a full page photo editorial in its signature *Ebony* magazine but also produced professional-grade PSA's with "Ebony-Jet TV Showcase" hosts Deborah Crable and Darryl Dennard for use by the Census Bureau. The National Newspaper Publishers Association distributed countless press releases and feature stories to its 130 member newspapers on all aspects of the census. The Sheridan Broadcasting Network broadcast many PSA's—representing hundreds of thousands of dollars of pro-bono air time—in its news and music programs. Black Entertainment Television's five-part news series on the census was comparable to that of the general media.

The AIAN media response in promoting the 1990 census was high. Indian newspapers nationwide, which received specifically tailored press packets, regularly carried articles and public service ads about the census; several ran front-page stories to alert readers about what went on

nationally as well as in their own communities. On the broadcast front, a telephone survey of tribal radio stations in early April showed that all of those contacted planned to air the AIAN PSA's and other census productions such as the videotape, "Listen to the Drum," and docudramas.

Numerous API organizations worked to promote the census to their constituencies. After seeing the benefits of the census for their particular ethnic groups and for the API community as a whole, the race question, particularly, became of interest to the organizations. Confidentiality of the responses was always a concern. Organizations such as Asian American Voters Coalition, Cambodian Network Council, and Indochinese Resource Action Center provided support in several ways: Endorsements, census messages at their annual conferences, speeches, workshops on the census, distribution of material through their networks, articles in their newsletters and newspapers, and inclusion of the census in their festivities.

In addition there were special events such as the "1-800 National Telephone Assistance Rally," which announced six dedicated phone numbers in six Asian languages. MCI Telecommunications cosponsored the rally, which Communications, Inc., staged separately on the east and west coasts. (See p. 31.)

The arrival of Filipino President Corazon Aquino brought together island leadership from all over the country. The Philippine Heritage Federation sponsored a dinner at which the Filipino-American Political Association distributed its special booklet, "The Filipino Population of the U.S.—a Special Profile." The event also featured a speaker from the Department of Commerce.

## Promotional Products

CPO's Creative Services group (a team of writers, graphic designers, and audiovisual and production specialists) created products for both general and minority audiences.

Altogether, there were some 580 print audio/visual items. Approximately 190 were "core products" aimed at mass distribution. Others were ad hoc products designed for specific purposes such as personalized kits used by CPO's marketing specialists when visiting corporate officials, videos for special briefings, and handout kits for national conventions. Similar ad hoc products were designed to fit the needs of other Bureau clients. Other products were created, under CPO coordination, by Ad Council firms and the Institute of American Indian Arts. (See figs. 5-17 and appendix 5B). Several Bureau divisions had promotional items as well.

**Core Products**—Core promotional products basically were of seven types—brochures, flyers, posters, reproducible art, scripts, specialty items, and videotape—to appeal to five audiences: the general population and the four principal minority groups. Core products served multiple purposes, such as promoting the census, motivating participation, raising awareness, providing basic information about and results from past censuses, and recruiting staff.

Both CPO and outside contractors were involved. For instance, a CPO graphics artist conceived and created the poster for the BLK population featuring singer Marian Anderson. The poster for the general population ("The Only Tool You'll Need") also was designed by in-house promotional staff. Contractors designed all other art posters, some flyers used by the CCAS's (others were made for the RCC's), and all products for the API population. CPO staff retained creative responsibility for the contractors' work, and all materials were sent to "customer" divisions at the Bureau—those that had requested a certain product—for technical review before acceptance.

Contractors met language translation needs, although foreign-language speakers at Bureau headquarters and in the RCC's reviewed the translations.

APSD contracted for printing publicity materials with the Government Printing Office (GPO) approximately 1 year before the census. GPO (and later, outside contractors) did the typesetting; a CPO editor proofread the typeset pages. All printing was done by GPO.

**Distribution**—When ready, promotional products (kits and individual items) were shipped to the Data Preparation Division in Jeffersonville, IN, for further distribution to community-based organizations (CBO's), CCC's, CAPP staff and their field offices (including RCC's, RO's, and district offices (DO's)), processing offices (PO's), SDC's, the Institute of American Indian Arts in Santa Fe, NM, and private organizations participating in joint ventures with the Bureau. The materials then were scheduled for distribution to target populations in two separate mailings, in January and February 1990.

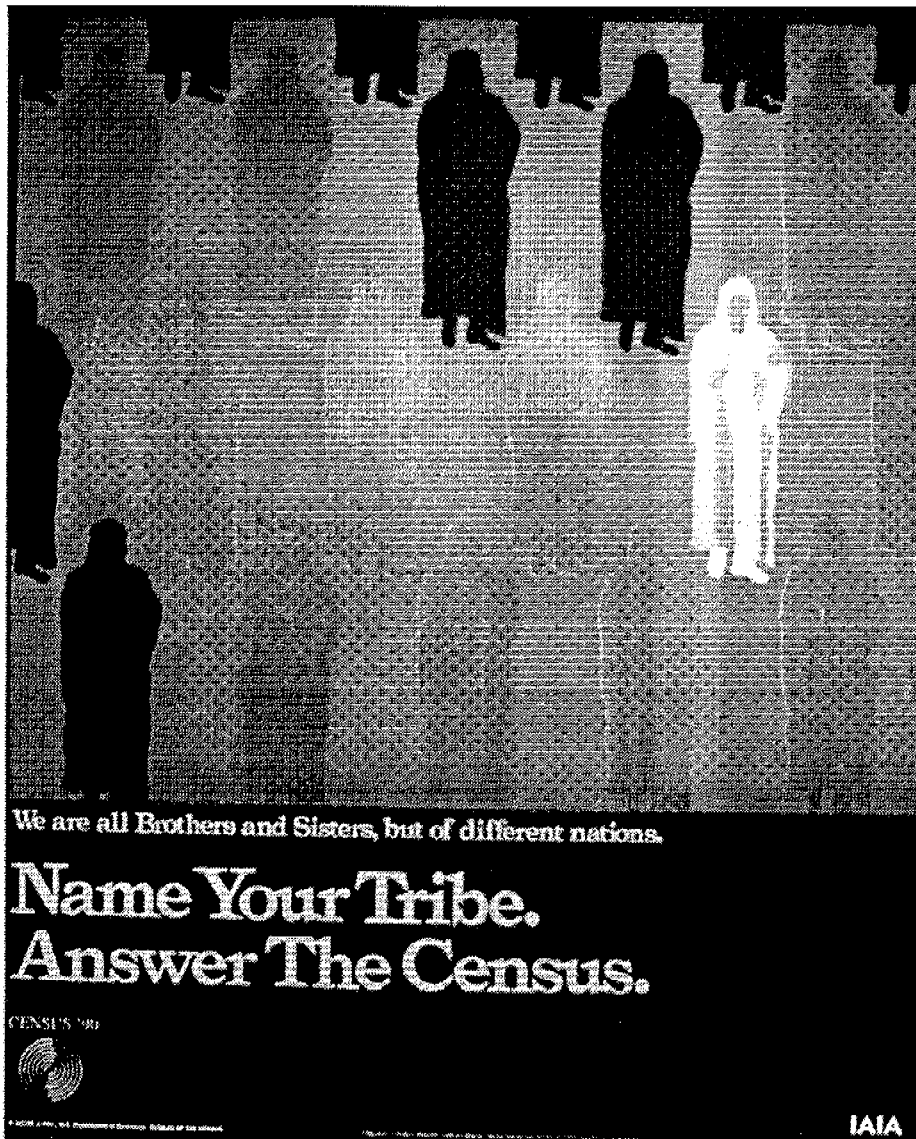
Delays in the production of promotional materials, difficulties in assembling and unduplicating a comprehensive address list of organizations that were to receive those materials, and other distribution problems prevented some of these products from arriving in the field on time.

A major achievement for Decennial Materials Assembly and Processing Section (DMAPS) in the Data Preparation Division during January 1990 was the assembly and shipping of the first mailing of the community-based organization kits, despite problems obtaining an overall label listing from the RCC's. The urgency of this project required considerable overtime. DMAPS assembled, labeled (with the assistance of United Parcel Service personnel), and dispatched a total of nearly 60,000 kits in this shipment.

Other related projects were scheduled to be worked on "as soon as possible," but "waiting for materials" was an ongoing status for many months. Nevertheless, the section staff of about 160 people was also able to assemble in January 1990 a total of 88,929 kits, of which 22,054 were generic kits, 2,742 were resupply kits, and 1,635 were Puerto Rico kits, as well as other census related work, such as labeling address registers.

In addition to the core products mentioned, there were in excess of 10,289,000 pieces of promotional and operational materials essential for the opening and operating of

Figure 5. American Indian and Alaska Native Census Poster (AIAN)



For Urban and Off-Reservation  
Native Americans

## **We Are All Brothers and Sisters...**

by Peggy Anakna

The painting, "Indians," by Peggy Anakna, was chosen for this poster. The nondescript figures represent the broad spectrum of American Indians and Alaska Natives who have relocated from their reservations and homelands. The sameness of the figures represents the numbers of the potentially uncounted, while the lone, more detailed figure depicts the importance of each individual in the census count.

Ms. Anakna is a member of the Suquamish Tribe, located in Suquamish, Washington. Her work can be seen at the Port Ludlow Cultural Center, Port Ludlow, Washington. She studied at the Institute of American Indian Arts from 1965 through 1967. In 1968 she returned as a graduate student.



Figure 6. American Indian and Alaska Native Census Poster

For All Native American Groups

### Listen to the Drum

by Jerry Ingram

"Calling the Eagles," by Jerry Ingram, uses the drum, an important symbol to the culture of Native Americans. The drummer is calling the eagles, who are sending a message to all American Indian and Alaska Native peoples to participate in the census count.

Jerry Ingram is a member of the Choctaw Tribe, located in Bhattiest, Oklahoma. He is currently working as a commercial artist in Corrales, New Mexico. Mr. Ingram studied at the Institute of American Indian Arts in 1962. He received a bachelor's degree in commercial art from Oklahoma State Tech, located in Okmulgee, Oklahoma, in 1966. Exhibits of his work have been on display in various galleries, both nationally and internationally.

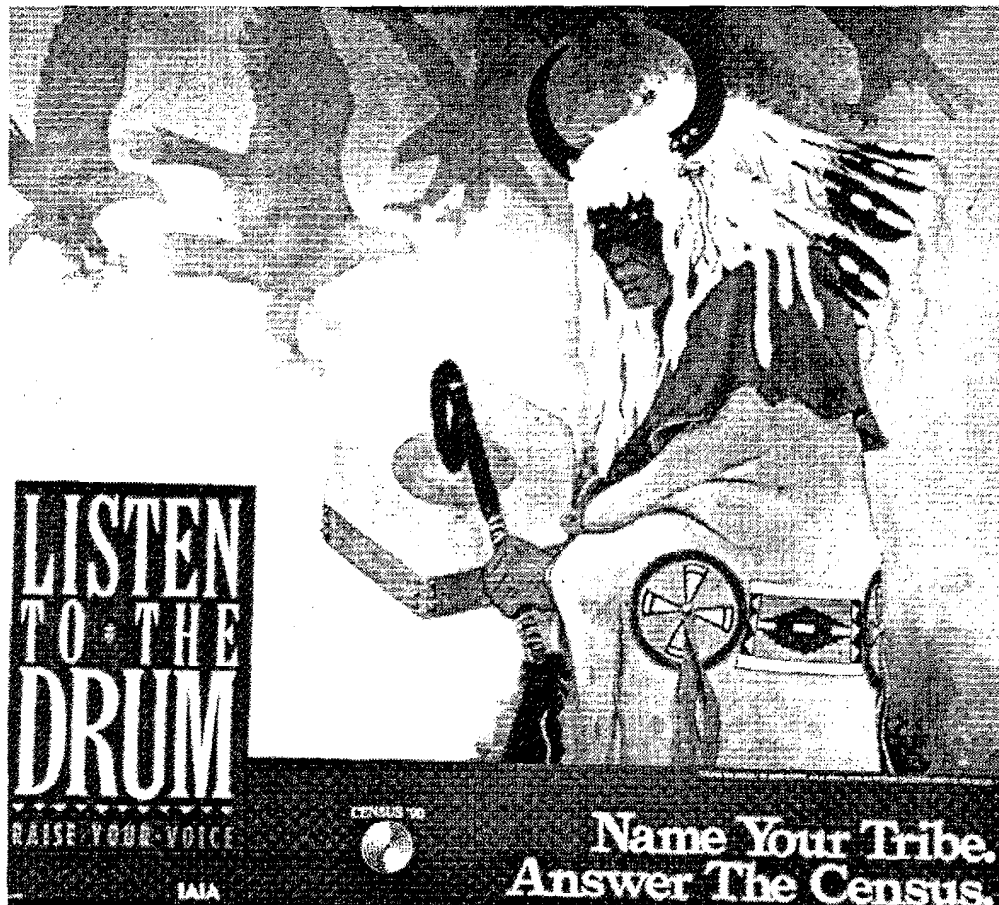


Figure 7. American Indian and Alaska Native Census Poster

Campaign kickoff poster

### Let Our Voices Be

Heard by David John

David John's painting, "Rain Makers," was chosen to represent the 1990 general census awareness poster. It was selected because the variety of figures, the abstractness of the design, and the use of color, represent the similarities found among many Indian groups.

David John is a member of the Navajo Tribe. He currently lives in Cedar City, Arizona. Mr. John attended the Institute of American Indian Arts from 1984 to 1986, earning an Associate of Fine Arts Degree. He is now continuing his education at Southern Utah State College. He has exhibited his work at the Navajo Tribal Museum in Window Rock, Arizona, and the Heard Museum in Phoenix. Awards include the Inter-Tribal Indian Ceremony and the Red Cloud Indian Art Show.

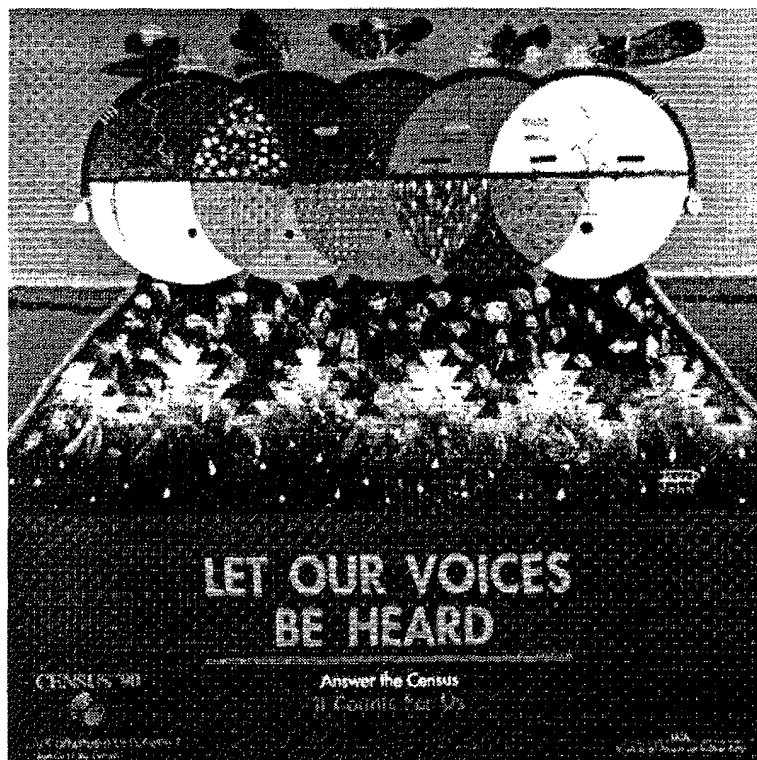
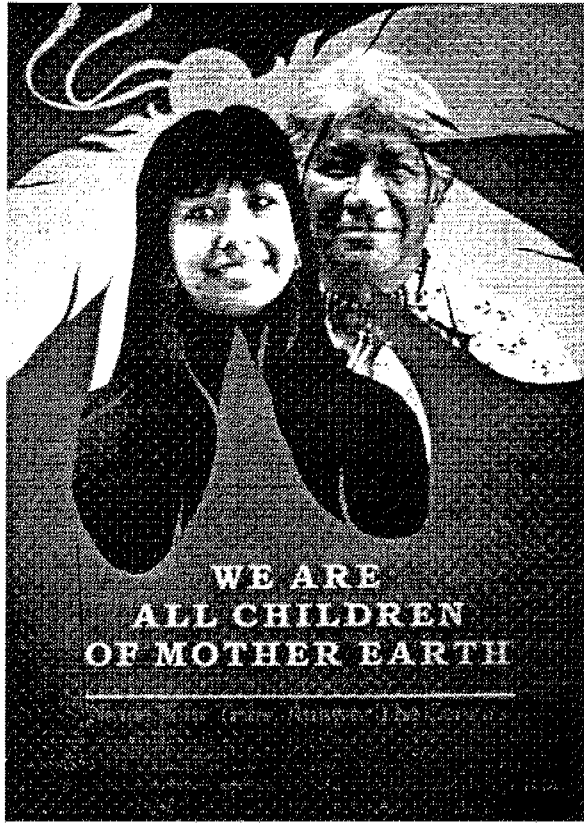




Figure 8. American Indian and Alaska Native Census Poster



For Native Americans  
On Reservation and Trust Lands  
**We Are All Children Of  
Mother Earth**  
by Larry J. DesJarlais

Larry DesJarlais' poster is an original design entitled, "Generation Coup." It incorporates eagle feathers, which are a national spiritual symbol to all tribes. The two individuals represent the Native American Community—male and female, young and old. The feather represent the existence of different tribes and the importance of their recognition in the 1990 Census.

Larry DesJarlais is a member of the Chippewa Tribe of the Turtle Mountain Reservation in North Dakota. An alumnus of the Institute of American Indian Arts, he is currently the head of the graphic arts department at the institute. Mr. DesJarlais received his bachelor's degree from the College of Santa Fe in 1987 and also studied at New Mexico Highland University in Las Vegas, New Mexico. His first exhibition was in 1975 at The Gallery in Anchorage, Alaska. Since then, he has exhibited his work in museums and galleries throughout the country. In 1987, he received a first place award for his ceramic sculpture at the 15th Annual Artists and Craftsmen Show at San Ildefonso Pueblo, New Mexico.

Figure 9. American Indian and Alaska Native Census Poster



For Alaska Natives  
**For Our Future**  
by Denise Wallace

Denise Wallace's metal jewelry was selected for the Alaska Native poster. The figures represent joyful people being gathered by the Eagle spirit to hear the Census Message—the importance of being counted. The circles are drums; the bearers of the message.

Denise Wallace is a member of the Aleut Tribe. She was born in Seattle, Washington, but spent a great deal of time visiting her grandmother in Cordova and Prince Williams Sound, Alaska. During these visits, her grandmother told Ms. Wallace many stories of the "old ones." These stories are now depicted in Ms. Wallace's jewelry. She attended the Institute of American Indian Arts from 1977 to 1981, earning an associate degree of art. She and her husband work together at their studio/gallery, located in Santa Fe, New Mexico. Her award-winning jewelry can be seen in galleries across the country.



Figure 11. Black Poster



Figure 12. Asian Poster

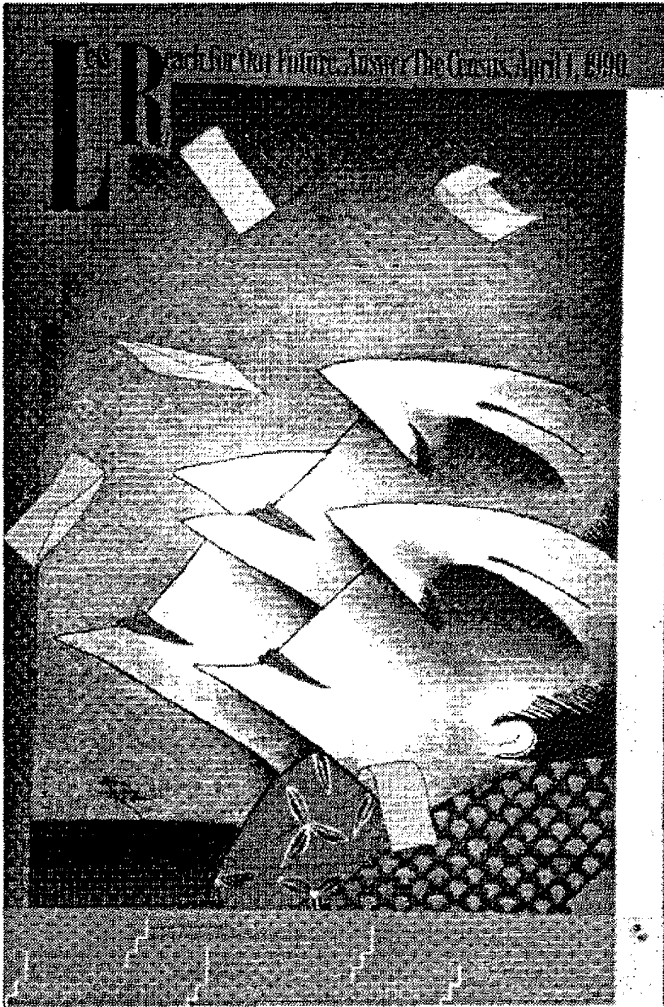
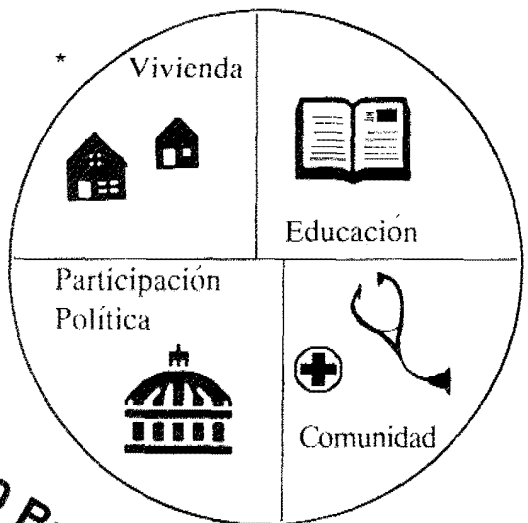
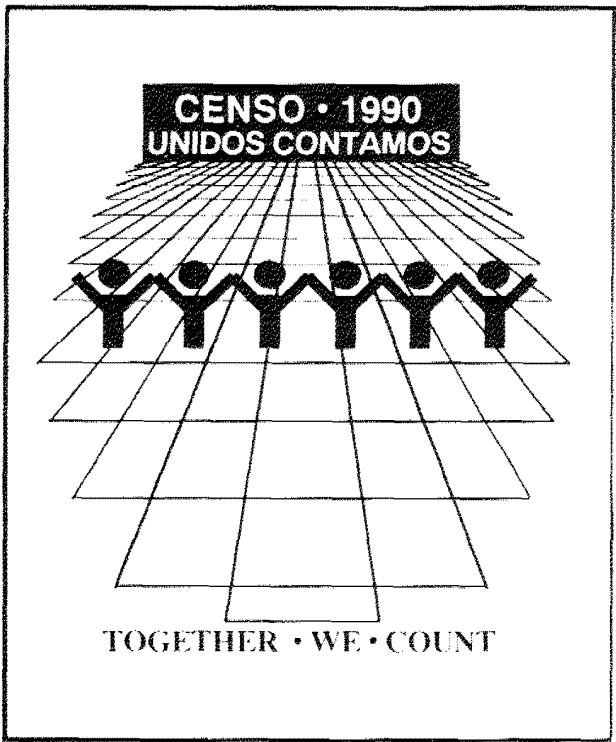


Figure 13. Hispanic Promotional Materials

# logos

clip and paste on your letterhead, brochures, bulletins or any other printed material you produce



Census '90 Button

\* Produced by ATMH International, Inc. for the U.S. Bureau of the Census, Washington, D.C.

## Census '90 Graphs

CENSO '90

*Census '90 Logo*

*¡Esta Es La Nuestra!  
Participe En El Censo.*

**CENSO '90**

CENSUS '90

**Only you can tell us!**

How many Hispanics are there in the United States?

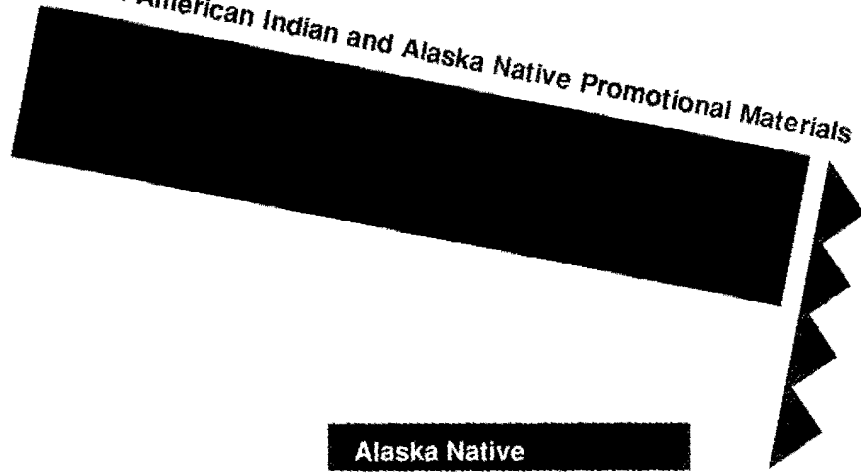
Make yourself count in 1990.  
Answer the census.

|           |            |
|-----------|------------|
| 9,072,602 | 14,608,673 |
|-----------|------------|

1990

Population of Hispanics as reported by the 1970 and 1980 Censuses.

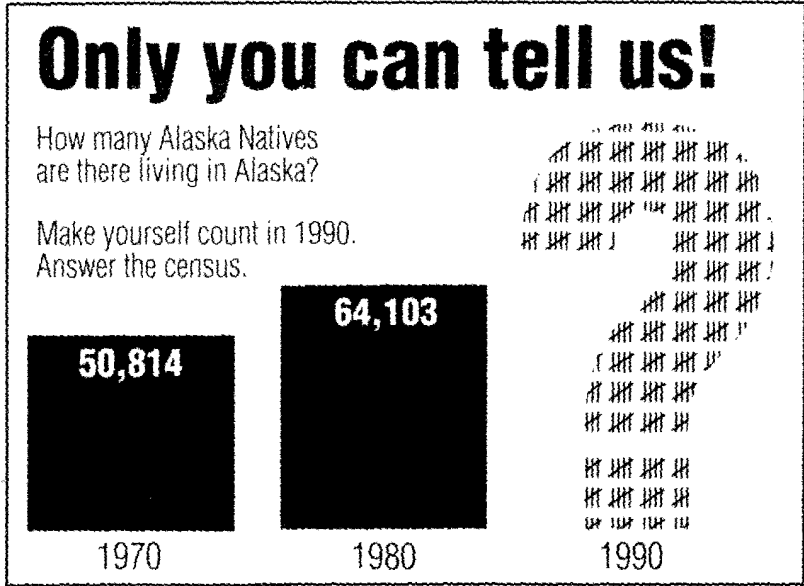
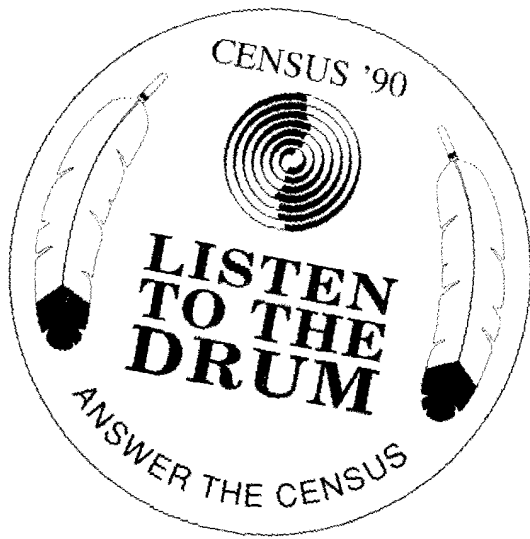
Figure 14. American Indian and Alaska Native Promotional Materials



# American Indians Alaska Natives

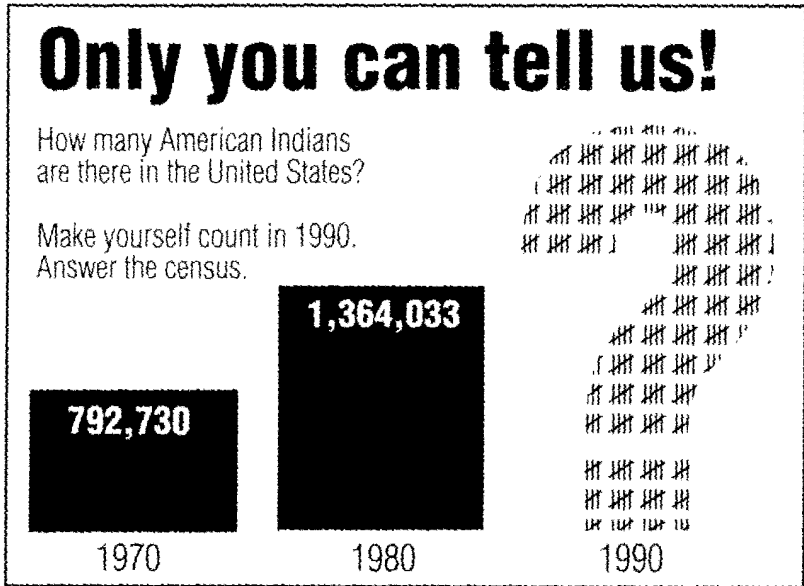
For a Full and Accurate  
Census Count in 1990

## Alaska Native



Population of Alaska Natives as reported by the 1970 and 1980 Censuses.

## American Indian



Population of American Indians as reported by the 1970 and 1980 Censuses.

Figure 15. Asian and Pacific Islander Promotional Materials

# Asian / Pacific Islanders

For a Full and Accurate Census Count in 1990

**Asian**

## Only you can tell us!

How many Asians are there in the United States?

Make yourself count in 1990. Answer the census.

### 3,466,874

1980

1990

Population of Asians as reported by the 1980 Census.

**Pacific Islander**

## Only you can tell us!

How many Pacific Islanders are there in the United States?

Make yourself count in 1990. Answer the census.

### 259,566

1980

1990

Population of Pacific Islanders as reported by the 1980 Census.

Census '90 Graphs

### Need Help Answering Your Census Form?

No problem. There will be a number on your census form that you can call to receive a form in Spanish or to get help from a census assistance employee who speaks your language. Or come in to one of the walk-in centers. It doesn't take long to complete the questionnaire. And, of course, you don't have to tell anyone who you are to get help.

**This Is Our Chance! Answer the Census.**

CENSUS '90

## CENSUS '90



*Any Way We Add It—  
It Makes Good Sense to Answer the Census*



**Need Help Answering Your Form?**

**Korean**

1-800-444-6205

**Vietnamese**

1-800-937-1953

**Cambodian**

1-800-289-1960

**Laotian**

1-800-888-3208

**Chinese**

1-800-365-2101

**Thai**

1-800-288-1984



Figure 16. Black Promotional Materials

# Black Americans

For a Full and Accurate Census Count in 1990

## Make Sure We Get Our Fair Share of:

### ■ Community Benefits

Funding for schools, health clinics, job training, community centers and other services depends on census population counts.

### ■ Voting Power

Representation in Congress, state legislatures and local voting districts is based on census numbers.

### ■ Recognition

Pride in our heritage and contributions to American culture is reflected in accurate census totals.

## Census '90 Graphs

CENSUS '90

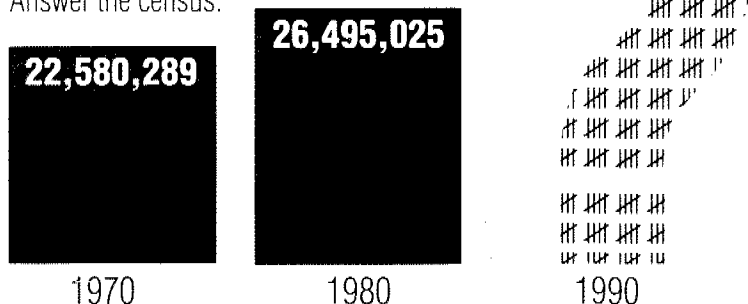


*Stand Right Up for Who You Are.  
Answer the Census.*

## Only you can tell us!

How many Blacks are there in the United States?

Make yourself count in 1990.  
Answer the census.



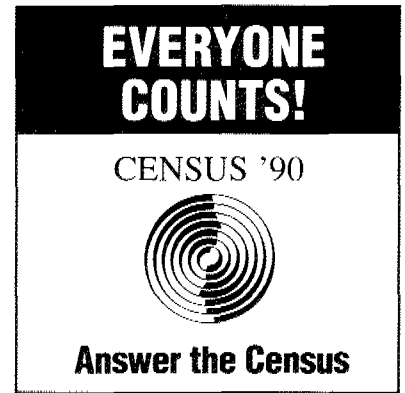
Population of Blacks as reported by the 1970 and 1980 Censuses.

Figure 17. General Promotional Materials

# Stand up and be counted.



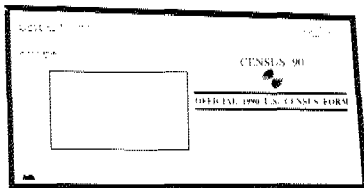
## Census '90 Button



CENSUS '90



## Census '90 Envelope Facsimile



# April 1, 1990. Answer the census.

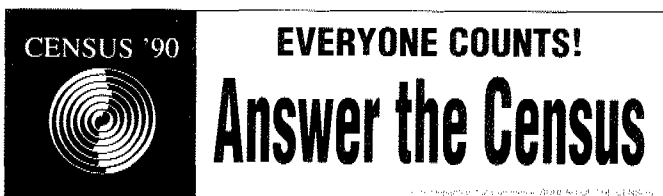
Your census answers can help your community make important decisions about needed services. Answer the census. It's good for all of us.

## Census '90 "Super Census"



## Census '90 PSA

*This public service announcement discusses benefits of the census and can be used for both radio and TV. It is available in 10-, 15-, and 30-second formats.*



English



### Need Help Answering Your Form?

Call toll free 1-800-999-1990 for telephone assistance from a census representative from March 23 to April 15 between the hours of 9:00 a.m. and 9:00 p.m., seven days a week.

district offices, unscheduled in the original DMAPS planning scheme but anticipated, based on the experiences of the last censuses. Many sponsors requested materials for various functions. Some of the many unexpected but required assignments in January and February were as follows:

| Assignment         | Product                             | Quantity |
|--------------------|-------------------------------------|----------|
| Assemble           | Education kits and information kits | 148,600  |
| Assemble           | Standard media kits                 | 198,400  |
| Assemble           | PIO, CPO, and CEP information kits  | 89,400   |
| Assemble           | CBO kits                            | 151,100  |
| Assemble           | <i>Community Action Guide</i> kits  | 270      |
| Assemble and label | CPO kits                            | 2,300    |
| Assemble           | Religious Organization Project kits | 392,100  |
| Label and insert   | Asian guides for district offices   | 450      |
| Assemble           | National Head Start materials       | 1,550    |
| Assemble           | Encuentro kits                      | 28,300   |

CPO held overall responsibility for core product distribution, which began January 24, 1990, and continued through late March. After April 1, only post-census promotional products were distributed.

In addition to core print products, the CPO video group's videotaped messages were distributed nationally for a wide range of audiences through duplication houses. Also, CPO distributed some titles through regional census information officers (RCIO's) and fulfilled individual requests. The National Association of Broadcasters (NAB) assisted with distribution to its member television stations. (See app. 5B for full listing of all products distributed.)

## Broadcasters Census Committee of '90

The Department of Commerce and the Bureau helped the NAB form the Broadcasters Census Committees (BCC '90) to encourage electronic media support. Local television managers in 150 markets served as BCC '90 chairpersons and took the lead in urging their peers to promote census participation by airing PSA's, special programs, public affairs shows, editorials, and the like. In particular, those who had participated in the 1980 census and managers of stations doing minority-oriented programming were sought. Adding radio managers, at the suggestion of industry experts, meant 300 local media cochairs were championing the census in the Nation's largest media markets. (BCC '80 had been limited to television.) In addition to pledging a maximum effort from their own stations, chairpersons were expected to rally the other stations in their markets.

Organization of the BCC '90 was the responsibility of a public affairs liaison from the Department of Commerce and an expert consultant who was a retired advertising executive and former Ad Council president. Both had been involved in a similar effort for the 1980 census. An announcement of BCC '90's formation was made by press release in December 1988, and by mid-summer 1989, the full membership was in place.

The BCC '90 undertook special efforts to assure that the census messages were publicized over the Nation's airwaves. These included but were not limited to: (1) a special network prime-time TV program, the night before Census Day, instructing the public on how to complete the census form, (2) special promotional activities geared to cable TV, and (3) presentations at every State broadcasters' association annual meeting during 1989. The committee also encouraged national TV and radio networks as well as local stations to produce on their own (with Bureau assistance) a variety of programming and/or informational spots (similar to the 1976 "Bicentennial Minute" and the later Columbia Broadcasting System (CBS) "American Portrait").

The NAB also helped "kick off" the television and radio advertising campaign by undertaking a massive live satellite transmission of Ad Council PSA's to all its member stations for them to record. This was accomplished through NAB's electronic magazine, called TELEJOURNAL, a monthly video transmission to member television stations. The January 19, 1991, TELEJOURNAL presented the 1990 census public service campaign and encouraged its use. Running 54 minutes, the program contained an interview with Department of Commerce Secretary Robert Mosbacher, appeals by the BCC '90 national cochairs, and PSA's by U.S. President George Bush and "Miss America." The concept was an original one for census promotion that increased the impact of the NAB endorsement and greatly simplified distribution of PSA products. Additional footage was included in the NAB's February transmission.

RCIO's and CAPP media specialists, briefed on the national kickoff by the CPO, encouraged local television BCC '90 chairpersons to arrange a local kickoff featuring a videotape of the NAB satellite transmission within a few weeks after the national one.

NAB also designed and produced a 16-page brochure, titled "On-Air Initiative," devoted to the census with CPO material that could be used by radio and television stations. This brochure went to all stations, whether they were NAB members or not. The BCC '90 also sent personal letters to network news personalities requesting that they support the census over the air.

The entire BCC '90 project, including nominating and mailing to 300 broadcasters, designing and donating the BCC '90 stationery, the brochure, and the satellite transmission, was done by the NAB without cost to the census. The NAB's public service director also provided pro bono support.

The CPO contacted 300 local cochairs by telephone between March 22 and March 27, 1990, to thank them for their help, ascertain what they had done on the air, and remind them that the Bureau needed their help well into April. It was found that the cochairs had exerted a maximum effort, which often took the form of using Ad Council PSA's; creating PSA's using station talent, local government officials, and celebrities; and broadcasting editorial content in support of the census. Sometimes stations used

Ad Council PSA's exclusively. As documented by the Vitt Media report discussed on p. 45, the electronic media contributed substantial air time to the 1990 census.

In comparison with the 1980 effort, BCC '90 tapped television station managers in 150 rather than 100 markets, considered radio to be of sufficient importance to merit separate treatment, obtained full support of the NAB as compared with letterhead endorsement, and took advantage of the latest technology—satellite transmission—to boost electronic media support of the census.

## Census as News

**1990 Census Media Plan**—Because of its importance in providing key data to meet vital national interests and because it occurs so infrequently, the decennial census was a major news story. The Times Mirror Center for the People and the Press reported that the census was the “fourth most closely watched” news story during April 1990. CPO staff developed media plans and procedures for carrying out a coordinated media campaign, promoting positive coverage and responding to media queries. This staff at headquarters was aided by RCIO's<sup>8</sup> who supplemented the national media outreach effort for their specific media and geographic areas.

In June 1989, CPO issued a media plan and standard operating procedures for its own staff and RCIO's for handling news queries and news and feature releases. There were detailed plans for each minority media promotional campaign and for specific national media events, especially coverage of the “Shelter and Street Night” operation on March 20-21, 1990 (see below).

CPO issued news releases, feature releases, fact sheets, and media kits, and staff attended media conventions. There were 161 news releases between November 1988 and June 1990, about one-third nationally through the Department of Commerce, one-third to RCIO's for local use, and one-third were State-specific releases sent directly to appropriate daily and weekly newspapers. Press releases were generally mailed to a national media list of 210 addresses. Three-fourths of those were Washington, DC-based, and one-fourth were census “beat” reporters in major news organizations around the country. There were also AIAN, API, BLK, and HISP media lists. Examples of national, general-interest press releases included “One Year to Go” (Mar. 31, 1989), “Census District Office Openings” (Oct. 17, 1989), “What the 1990 Census Will Tell Us” (Jan. 30, 1990), “Commerce Secretary Kicks Off Census” (Feb. 5, 1990), “Questionnaire and Telephone Assistance Available” (Mar. 14, 1990), “Questionnaires Delivered” (Mar. 22, 1990), and “Civic Leaders Urge Support for the Census” (Apr. 13, 1990).

<sup>8</sup>A regional census information officer was a liaison in each region to CPO's information services specialist. The RCIO was a temporary position for the 1990 census and was funded from CPO's budget. The RCIO served as the regional expert to the regional director in the formulation and articulation of overall strategies to guide public-affairs issues toward the success of the census.

CPO released 19 feature articles through news distribution services that offered camera-ready copy to daily and weekly newspapers serving target audiences. In addition, Information Services staff sent out over 50,000 general media kits that contained basic background information on the census, including a series of nine fact sheets.

CPO staff set up exhibits and conducted workshops at national media conferences, and RCIO's made similar presentations at State media conferences and conventions. These contacts alerted the media to the news value of the census and informed them about the value of census data to the communications industry.

Another major census-as-news function was to answer inquiries from the media and public. In the 19 months from December 1988 to June 1990, CPO staff handled some 1,900 media inquiries, about half of these in the 3 months from March 15 to June 15, 1990. In the 10 months from August 1989 to June 1990, IS received about 11,000 public requests for information or other types of calls, about 2,000 of which required the mailing of some information. About one-third of the calls were queries from people who had not received their forms, were asking for assistance, or were voicing complaints, and about one-fourth concerned census jobs.

**S-Night Media Plan**—On March 20-21, 1990, the Bureau counted certain segments of the homeless population. The operation was “Shelter and Street Night” (S-Night). From 6 p.m. to midnight, local time, enumerators counted people in shelters identified before the census and in hotels/motels that cost less than \$12 per night. From 2 a.m. to 4 a.m. local time, enumerators went to predetermined street and other outdoor sites where people were known to sleep or congregate. They were instructed to count all visible people even if enumerators had to estimate age, race, and sex. No questions were asked to determine if the persons considered themselves homeless. From 4 a.m. to 8 a.m. local time, enumerators waited outside abandoned or boarded-up buildings that were believed to be used for sleeping, counted people coming out, and attempted to get information from these individuals about others who might be inside. (See ch. 6 for details.)

Approximately 15,000 enumerators were involved. Third parties who were supporting efforts to count people in shelters and on the streets, such as Members of Congress, mayors, other elected officials, activists, national organization heads, etc., helped emphasize the importance of including the homeless in the census counts and acknowledged that the counts were limited but important.

The network and print media devoted major coverage to S-Night. The staff solicited their cooperation in respecting respondent confidentiality before they were actually on the street pursuing a story and offered them as much assistance as possible. Because of statutory restrictions (Title 13, U.S. Code), coverage of actual enumerator interviews with people in shelters or on the street would violate privacy and confidentiality. Therefore, the media had the following options:

- Through national organizations (NAB, AP, UPI, etc.) and regional and district office contacts, they could obtain information from the Bureau about the legal limitations and responsibilities inherent in S-Night activities.
- Live briefings by Bureau and other officials at various times on March 20 at national, regional, and local levels.
- An opportunity to interview enumerators and/or field supervisors before and after S-Night activities.
- Staff-arranged interviews with shelter operators who supported the count and an opportunity to film in a cooperating shelter before and after S-night.
- An opportunity to film enumerators starting out on their tasks but not inside shelters or close up on the streets.
- Availability of census officials the morning of March 21 for interviews, news show appearances, etc.

Letters from the director were sent to the heads of major national news organizations and associations, asking for cooperation in protecting the confidentiality of census answers and outlining details of planned cooperation.

Contacts with national and local government and organization officials to seek support and participation were scheduled in 1990 as follows:

- Feb. 26 Send S-Night release to trade media.
- Mar. 6 Meeting with regional census information officers in Washington.
- Mar. 14 National/regional/local media "advisory" planned for media opportunities and privacy/confidentiality issues.
- Mar. 20 Planned photo opportunities/interviews at cooperating shelters. S-Night news conference in Washington.
- 2 p.m. local time, RD's news conference in major cities.
- 4 p.m. local time, district office managers and/or special place operations supervisors available to media to explain how the census was to be conducted locally.
- 5 p.m. local time, media center set up—to interview enumerators before starting and to film enumerators approaching and departing shelters.
- 11 p.m. local time, officials available for live nightly news interviews.
- Mar. 21 1 a.m. local time, media center interviews with enumerators.
- 1:30 a.m. local time, film enumerators going out to start street count.
- 6:30 a.m. local time, enumerator interviews regarding night's experience.
- 6:30 a.m. local time, interview national, regional, and local officials on operations (also available for morning news shows).

CPO coordinated media activities with PIO and FLD, and especially with the RCIO's for the field media activities. On the other hand, the RD's implemented the plan in their regions with the aid of 31 regional media specialists.

Information Services staff handled the S-Night media information operations which had the special 301-763-1990 telephone number at Bureau headquarters throughout the 20th and the 21st. They responded to media queries and served as a channel of communication between headquarters and FLD in regard to media matters. FLD personnel had instructions on what was and was not allowed. For example, news persons were able to interview enumerators about their experiences as long as no actual names or addresses were divulged. News representatives could not visit DO's without first registering and being given visitor passes.

### Private Joint Ventures

The joint ventures program, by CPO's marketing unit, supplemented the Advertising Council and Bureau promotion and outreach through partnerships with national corporations and membership organizations to gain the benefits of their widely varied communication channels and customer, employee, supplier, and constituent bases. In-kind services, such as census message inserts in billings, and articles and ads in external and in-house publications, were sought from these organizations. The CPO solicited this pro bono support; by December of 1989, it had generated over 300 agreements across the country. By including DUSD's NSP clients, the overall total represented more than 400 marketing efforts focused on the census.

It also was clear, however, that considerable attention had to be given to groups differentially undercounted in the 1980 census. Consequently, four marketing plans were developed, respectively, for organizations with large AIAN, API, BLK, and HISP constituencies or customer bases. There also were strategies for targeting major government entities, labor unions, and cable television systems.

At the beginning of 1990, 312 joint venture agreements were active—varying from simple endorsements to multi-level commitments. CPO's marketing staff divided accounts into 23 separate types, from advertising to utilities; 10 of the types covered three-quarters of the joint venture effort. (See table 1.)

**Table 1. Joint Ventures With National Corporations/ Membership Organizations (April 1, 1990), 10 Largest Types\***

| Rank                    | Percent |
|-------------------------|---------|
| Total .....             | 75.5    |
| Trade association ..... | 16.9    |
| Advocacy .....          | 11.9    |
| Food & beverages .....  | 8.2     |
| Manufacturing .....     | 6.8     |
| Educational .....       | 6.1     |
| Civic .....             | 5.3     |
| Religious .....         | 5.3     |
| Retail .....            | 5.1     |
| Media .....             | 5.1     |
| Unions .....            | 4.8     |

\*Remainder: Advertising, financial services, government, health, hospitality, insurance, social services, sports, transportation, and utilities.

Audience type was the second major component of the joint venture project. The umbrella-like general audience category (including all minority populations) accounted for slightly over half of joint venture activity. (See table 2.)

Each of the partnerships involved from one to eight specific commitments, with an average between three and four. Most organizations had commitments beyond the traditional formal endorsement.

**Table 2. Distribution of Joint Ventures, Including National Services Program, by Audience**

| Audience                            | Number | Percent |
|-------------------------------------|--------|---------|
| Total .....                         | 413    | 100.0   |
| General .....                       | 210    | 50.9    |
| Black .....                         | 58     | 14.0    |
| Hispanic .....                      | 37     | 8.9     |
| Hispanic-Puerto Rico .....          | 48     | 11.7    |
| Asian/Pacific Islander .....        | 41     | 9.9     |
| American Indian/Alaska Native ..... | 19     | 4.6     |

Among those commitments negotiated most often were the following:

- Census message inserts and imprints on customer billings and employee pay statements; articles, ads, and feature stories in both internal and external company publications.
- Paid advertising and/or public service messages; tagging of radio, TV, and print ads; and cooperative tie-ins with other organizations.
- Use, display, and distribution of census promotional products/messages or of an organization's own promotions with CPO's reproducible designs.
- Product package tie-ins using the census logo and slogans, especially to reach minority communities.
- Sponsorship of special events such as sales/contests and musical concerts with focus on the census.

Trade associations, the largest segment of the joint ventures program, included the American Society for Association Executives, the National and the American Newspaper Publishers Associations, the Asian American Journalists Association, the National Association of Black Journalists, all United States chambers of commerce and the range of similar race/nationality chambers, two printing associations, the Food Marketing Institute, the National Association of Convenience Stores, the National Bankers Association, and the Candy Wholesalers National Association. Also helping were the Milk Industry Foundation, the Snack Food Association, the United Services Organizations (USO), and the Public Relations Society of America.

Joint ventures with trade associations added the potential for multiplier effects. Examples were the Food Marketing Institute's effort, which was directed to 70 percent of the supermarket industry, and the National Association of Manufacturers, which covered a 14,500-member list. The

food and beverage industries offered many opportunities to communicate extensively to all population groups. Some of the key supporters in this important category were the Campbell Soup Company, Coca Cola, Pepsico, Cumberland Farms, General Foods, General Mills, Giant Food, Church's Fried Chicken, the Bacardi Corporation, and the Nestle Food Corporation.

Among the manufacturing supporters were Ford Motor Company, General Motors, Honda USA, Digital Equipment Corporation, Exxon Corporation, DuPont, Goodyear Rubber, and the UNISYS Corporation.

Civic groups included the American G.I. Forum, American Legion, AMVETS, the Association of Junior Leagues, Daughters of the American Revolution, Girl Scouts and Boy Scouts USA, Southwest Voters Registration Project, and the Veterans of Foreign Wars.

Health and education categories served as the basis of nearly 10 percent of the joint ventures. The American Academy of Physician Assistants, the American Public Health Association, the Association of State and Territorial Health Officials, and the National Association of Community Health Centers disseminated Census '90 messages to their memberships and down to their networks of clinics and independent health programs.

Among the primary social service organizations subscribing to the program were Catholic Charities USA, Goodwill Industries of America, Interaction, the National Association of Community Action Agencies, the American Red Cross, and the United Way of America, all with widespread capacity to communicate with their members and the general public.

Retailers formed a substantial element of the promotional campaign, led by J.C. Penney, Montgomery Ward, and Sears Roebuck. The important contribution of DDB Needham Retail, an advertising agency representing 105 retail accounts, was especially noteworthy; among those accounts were Long's Drugs, Ralph's Grocery Stores, Raley's Supermarkets, Homart Development, Crown America Corporation, Hills Department Stores, the Price Club, the May Centers, Discover Card, K-Mart Corporation, and Walgreen Drugs.

Safeway stores had grocery bag and milk carton imprints, census posters (900 stores), advertising "dropins," and employee pay stub messages.

In February 1990, Chrysler Corporate Communications generated a variety of Census '90 messages by weekly Chrysler Times, InfoNet (daily news phone messages), a supplier newsletter, *Chrysler Employee News Daily*, and *Idea Exchange*. Approximately 150,000 people received three to four messages intermittently until the last 2 weeks in March, when Chrysler conducted an "information blitz" through a network of 200 local communicators and plant managers in 100 locations around the country.

**Cable Television**—The use of cable television was among the new approaches the CPO took to marketing the census. Since 1980, cable networks had tripled in size. As of April 1990, they served 50 million subscribers, or

54 percent of American homes. Far from the days when it was a community antenna service for mountain towns, cable had more than 40 nationwide networks plus a number of popular regional sports channels for its subscribers. The objective was to involve cable television in giving air time to the Ad Council ads, producing and airing ads geared to specific audience segments, promoting the census through messages on monthly subscriber bills, and by participating in community as well as statewide census projects. The National Cable Television Association (NCTA) was the major trade association for cable television and operators.

- In November 1990, the NCTA board of directors passed a unanimous resolution to support and promote the census.
- In December 1990, NCTA put together a community action booklet (based on the artwork in the CPO Communicator's Kit) and mailed it with a cover letter from its president, Jim Mooney, to 2,500 cable television operators.
- In January 1990, NCTA sent a letter to 350 local cable programmers telling them to tune in to the February 21 and 28 satellite feed of census spots and the "B-Roll" (a broadcast "Editor's Reel" including Bureau stock footage and Census '90 promotional visuals for use by broadcasters) footage from CPO.

There also were cable operators' associations in most States. They varied in their degree of sophistication and involvement in lobbying and in government relations, but the executives of these associations knew the operators on a first-name basis and were particularly effective in energizing them to promote the census.

The Ad Council's original cable television distribution list contained 400 addresses that included colleges, government offices, and public-access studios. A second list of 400, which may have been even more effective, included a fairly comprehensive inventory of local cable-advertising interconnections.

Cable distribution still seemed rather light by mid-February 1990. To make up for this, ESPN, the largest cable delivery system, added a Census '90 segment to its weekly nationwide promotional "feed" on Wednesday, February 21 and 28. The feed totaled an hour and included the Ad Council videos, the CPO B-Roll (13 minutes), President Bush and Miss America spots, Nancy Kwan's Asian spots, and the Listen-to-the-Drum spot for American Indians and Alaska Natives.

**Cable Networks**—Advertiser-supported national cable networks had a significant accumulation of open ad slots, representing a treasure for getting the pro bono census message to targeted audiences.

CPO selected the 20 networks with the largest subscriber base and set about soliciting their support. The goals were exposure for Ad Council and CPO messages, features focusing on census (talk show, public affairs, etc.),

and scheduling or creating programs celebrating the American people. For example, on January 10, 1990, C-Span televised a live program, interspersed with tape interviews, from the Census Bureau (9:30 a.m.- 3:30 p.m.) covering overall Bureau operations, including the 1990 census. It involved live interviews with the director and other key Bureau officials, and two live call-in panels.

General Motors Corporation (GM) had the following:

- Article and graphics in the March issues of *GM Today*, distributed to 500,000 employees and dealers, and *GM Encore* to 317,000 retirees and spouses.
- Census package by Info Briefs (biweekly news service) sent to 350 local GM plant communications coordinators around the country for use in early to mid-March.

GM estimated that these efforts alone would give each household recipient up to five separate impressions of census messages.

It was not possible to fund all aspects of the 1990 outreach program with Federal dollars if the Bureau were to create a truly national undertaking. While important to the overall outreach effort, some activities or projects, viewed as otherwise extravagant, were pursued through alternative funding sources, for example, private-sector corporations and philanthropic organizations. The Bureau asked corporations and businesses to aid in three ways: (1) through use of their own corporate resources, such as running notices in employee newsletters; (2) through direct in-kind services, such as sponsoring openings, receptions, kickoffs, and other events; and (3) through other support, such as encouraging the radio and TV stations to urge their clients to run census promotional messages. The Bureau tried to do some of this for 1980 on an ad hoc basis; for 1990, specialists worked full time on the private sector program. Examples of private sector activities that were implemented were: Ford Motor Company aired census PSA's over its cable network and Greyhound Lines, Inc. placed bilingual (English/Spanish) census promotional cards in over 2,000 locations. Southland Corporation (7-Eleven stores), in partnership with the National Association for the Advancement of Colored People (NAACP), the League of United Latin American Citizens (LULAC), and the Bureau, promoted the census in minority and urban communities and offered questionnaire assistance at many of its stores. Goodyear flashed census messages across the country on its famous blimps.

**National Kickoffs**—National "kickoff" events for specific populations were:

- Kickoff at the Apollo Theater (in New York's Harlem) February 26, 1990. Three hundred national, regional and local Black leaders attended despite 17-degree weather. In a surprise appearance, famed contralto Marian Anderson witnessed the official unveiling of Census '90's national poster recalling her historic performance at the Lincoln Memorial in 1939. The event drew coverage by TV networks, cable TV systems, and



radio stations. Speakers included the chief executive officers of the three largest Black organizations—the NAACP, the National Urban League, and the National Council of Negro Women. The Apollo Theater and Inner City Broadcasting Corporation hosted the affair.

- The Hispanic kickoff on March 22, 1990, was hosted jointly by the Univision and Telemundo TV networks, which simultaneously aired a national 2-hour entertainment program featuring Latino personalities extolling the census to an estimated audience of 5 to 10 million.
- The Asian and Pacific Islander national telephone bank kickoff, on March 27, 1990, brought together for the first time 100 leaders of the various API nationality organizations across the Nation for the unveiling of a nationwide telephone assistance system. MCI Telecommunications was the pro bono host.
- At the Census '90 kickoff to American Indians and Alaska Natives, March 14, 1990, in Santa Fe, NM, an array of American Indian leaders from urban, reservation, and trust lands joined in reaffirming support for the 1990 enumeration. This special event was hosted by the Census Bureau, the Department of Commerce, and the Institute of American Indian Arts.

## OUTREACH—PROMOTION

### National Services Program

The National Services Program (NSP), in the Data User Services Division (DUSD), served as the Bureau's primary contact with national nonprofit organizations that represented racial or ethnic communities or other special populations, notably those that had been undercounted in previous decennial censuses. (See also ch. 10.) The NSP's main goals were (1) to increase the awareness and use of census data products among the organizations contacted, and (2) to gain the active participation of these organizations and their local and regional affiliates in support of census data collection. To achieve these goals for 1990, the NSP staff maintained contact with the leaders of over 300 national organizations through site visits, briefings, and participation at their national conventions; negotiated with them to support promotion and recruitment projects; made them aware of census statistics useful for their organizations' needs; and promoted census data products and services through personal contacts, letters, memorandums, press releases, and other samples of these products. Specialists followed up with these organizations to implement their 1990 census projects. Finally, NSP worked closely with the CAPP staff in the regions as the latter interacted with affiliates of national organizations. For example, DPLD, working with the NSP, began developing an outreach program for Asians and Pacific Islanders. Over 15 national nonprofit organizations were identified and contacted, and their leaders offered cooperation and advice. Both DPLD and NSP staff attended and

exhibited census materials at these organizations' annual conferences, meetings, and conventions. The headquarters and regional office staffs worked very closely to insure census presence during all Asian and Pacific Islander activities both at the national and local levels. (See fig. 18 on p. 32 for national organization participation rates.)

**Decision Maker Meetings (DMM's)**—To increase census awareness and obtain official resolutions of endorsement from various organizations, NSP held DMM's with them in 1988-89. These resolutions, as policy statements, became part of the organizations' plans to be actively involved in 1990 census promotion and recruitment and to cooperate with the Bureau to achieve the common goal of a complete and accurate count. Although these meetings evolved through varying processes due to the diversity of the organizations, they all culminated in the organization passing a resolution of endorsement or issuing a letter of support. Ideally, they involved national organizations that had been working with the Bureau; however, the lack of a previous relationship did not preclude participation. DMM's were arranged between top Bureau officials and the organizations' leaders to explore how their groups might participate. A census representative who had been working with the organization made the initial contact through an executive briefing on the DMM process and how the organization's purposes and goals related to the census objectives. The benefits of an accurate count of all people and what that count meant to the organization were stressed. Any questions relating to policy or controversial interpretations were deferred to subsequent meeting(s) when executive-level Census officials addressed them as issues separate from the organization's endorsement.

The DMM's had three major goals involving 1990 census outreach:

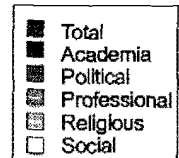
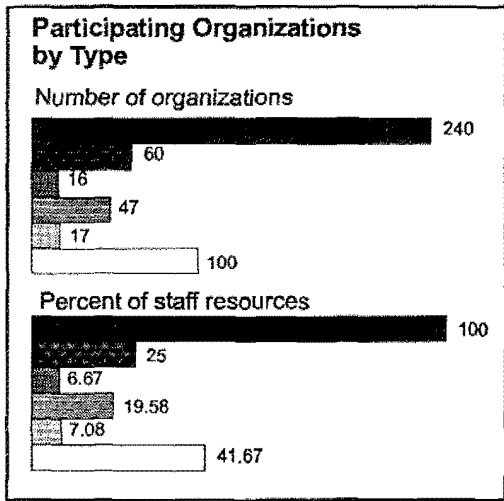
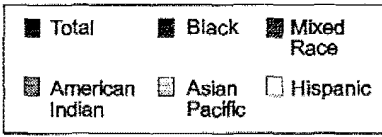
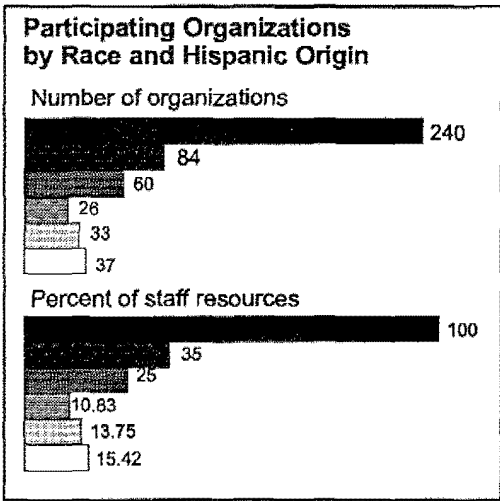
1. To have the leadership of each national organization declare its official endorsement of a complete and accurate count of all people in the 1990 Decennial Census.
2. To have the leadership of each national organization publicize its endorsement of the 1990 census through its own publications and publicly through the media, urging its full membership and the public to cooperate.
3. To seek the full cooperation of regional and local affiliates of national organizations with the local CAPP staff and to assist in the recruitment of qualified candidates for temporary census jobs.

In addition to its resolution, the organization was asked to furnish a mailing list of its regional and local affiliates. These were to be encouraged by their leadership to work with the local CAPP staff on promotion and recruitment. FLD passed the endorsements and/or letters of support to the regional CAPP staff, which—

1. Added these organizations to their regional mailing lists, if not already included.

Figure 18. National Participation Rates

NATIONAL SERVICES INFORMATION



Academia = Education, Research  
 Professional = Legal, Professional  
 Social = Advocacy, Social Services, Media

2. Followed up with telephone contact and/or a site visit.
3. During the site visit made reference to the resolution of endorsement and/or letter of support.
4. Included these organizations in the appropriate Census-initiated network.
5. Obtained a commitment from the local organizations to support the census by distributing materials, providing office space, recruiting personnel, and so forth.

(See Appendix 5C, Selected National Organizations Endorsing the 1990 Census.)

**NSP Promotion**—The Bureau maintained communication through the following:

- NSP memorandums (periodic mailing of information on data products, 1990 planning, etc.).
- Speakers and exhibits at national conferences and conventions (NSP, with Bureau-wide support).
- Meetings, executive data briefings, and correspondence (NSP).
- Regional CCAS's contacts with regional and local affiliates of national organizations.
- Press releases sent to magazines, periodicals, and newsletters published by national organizations.
- Other Bureau-wide contacts encouraged by NSP and DPLD to help create a sense of familiarity with census activities on the part of representatives from national organizations.

### Census Awareness and Products Program

Outreach efforts were not limited to the national level. Field Division's community-based Census Awareness and Products Program (CAPP) garnered support and endorsements through a variety of means. Census community awareness specialists (CCAS's) set up exhibits at national and local organization meetings, conducted census data workshops, and made presentations to community-based organizations, community leaders, and service providers in areas with sizeable minority populations. The 1990 CAPP outreach efforts started much earlier (1985) than comparable 1980 efforts (1978).

Through information, community meetings, and media networks, CAPP staff, with their training background (see below) were responsible for implementing the Bureau's outreach efforts for the 1990 promotional campaign. They were involved in government, educational, religious, and other Bureau projects (see below) to spread the message about the importance of census participation to communities, especially the census high interest areas (CHIA's—traditionally the undercounted populations).

**Training Program**—The CAPP training program was a series of integrated nationwide training activities aimed at preparing the Bureau's outreach staff—CAPP coordinators and team leaders, CCAS's, media specialists, and ISS's—as well as tribal liaisons to effectively promote the census:

- “You And The Public”—Communication skills training with three components: (1) “Cultural Awareness,” with emphasis on the cultural influences on communication and identifying one's own cultural identity; (2) “Dealing With the Angry Public”—in which participants learned to understand and calm anger, and manage stress and burnout; (3) “Communicating With the Public”—covered topics on public speaking, managing time, and planning and managing meetings.
- “Media Training”—Intensive training by a contractor on the news media and on techniques for effectively dealing with them. These included extensive on-camera experience and familiarized participants with different types of news media, how to get comfortable “on camera” and how to handle difficult questions, audience analysis and targeting, and effective speech and presentation.
- “Management Training”—Periodic training/updates for CAPP management staff. Topics covered were the Bureau's philosophy, organizational structure, policies and procedures; the agency's culture and how it affected program management; community issues and institutions that shaped management and impinged upon achievement of CAPP goals; and behavioral dynamics (team formation and management, motivational patterns/individual differences, leadership, power and authority, conflict management, and decision-making) affecting management skills.
- “Tribal Liaison Program Activities—Training/Alaska Native Village Liaison Training”—Tribal liaisons were invited to participate in training workshops about census field operations and tribal involvement, data-collection activities affecting tribal areas, tribal community outreach areas, tribal data use, and census products.
- “Cultural Awareness”—Understanding customs and traditions of cultural groups prominent in each region and ways of promoting the census to them. This was designed, planned, and conducted in each region at various times.
- “Initial Skills Training”—Staff preparation to respond to requests and inquiries by data users. Topics covered were information on the variety of Bureau statistics, use of census documents, administrative reporting, networking, tribal liaison program (TLP) and regional priorities, e.g., Denver RO elected to spend extra training on the TLP due to regional population needs.
- “Training the Trainers”—Preparation of coordinators and team leaders to train regional CAPP staff according to procedures outlined in the CAPP training manual.
- “Census Products Training”—Designed for information specialists and covered topics related to the use and dissemination of census products.

**Community Network Project**—CCAS's established and maintained working relationships with CHIA's through community networks, with the goal of reducing the differential undercount among minority populations. The principal strategy was to create networks of formal and informal community leaders. Some leaders would be data users who knew the importance of the census to the community, while other leaders may not have been as aware of the census and its data products. A series of meetings that stressed the importance of the census and the availability of data products built a base of census spokespersons among these leaders.

**Communications Media Project**—This project was to promote the use of census PSA's by all media. CAPP media specialists distributed press releases and feature stories, arranged for interviews of Bureau staff on radio and television programs and in print media, encouraged the production of PSA's with local personalities, solicited media coverage of major census events (open house, press conferences), arranged for paid classified advertising for recruitment, and secured editorial endorsements.

**Information Services Program**—As a natural progression from census cooperation to census data use, this program had CCAS's and ISS's disseminate census data to the public, making them aware of the availability of data products and demonstrating their importance for Federal, State, and local business and community use, for example, neighborhood statistics in planning the construction of day care centers.

## Government Outreach Projects

**Mayors' Cooperation Program**—In 1988, a working group of Bureau managers directly involved in decennial planning and operations felt that highly visible personal visits by the agency's high-level officials with carefully selected key mayors would demonstrate to local government leaders the commitment and importance attached to the census. The group also agreed that the director's personal involvement and leadership would enhance the program's effectiveness.

Thirty-five key cities were selected for visits, generally based on city size, enumeration difficulties in 1980, expected difficulty in 1990, sizable populations of historically hard-to-enumerate persons, legal contention over 1980 counts, and geographic distribution. A few cities were included because their mayors were known to have strong personal commitment to a successful census. It was hoped this would increase the likelihood of a positive and enthusiastic response from other urban leaders. For example, on March 31, 1989, Phoenix had been named as a "Model City," and it had a good census outreach program.

In meeting with mayors, the director or his designee discussed the benefits and needs of the city for an accurate census and why the mayor's assistance was important. Then, the mayor was asked to name a high-level career staff person, such as the city manager, and a political official to act as a contact on census issues.

In addition to the 35 key cities, regional directors were instructed to visit other cities—at least one in each State—in their regions. These were defined as larger cities and ones where difficult enumerations were encountered in 1980 or expected in 1990. These visits, by the regional directors or the next level of management from their staffs, followed the same agenda as for the 35 key cities.

The Government, Commerce, and Civic Relations Staff coordinated this program. Given budgetary and other considerations, including some overlap with such activities as the meetings and committees described below, it ultimately had to be suspended.

**Local Complete-Count Committees (CCC's)**—As noted, from April 1988 to July 1990, the Bureau initiated a number of promotional and operational projects at the national and local levels to obtain a complete and accurate count. Among them was the CCC; the Field Division (FLD) directed this project. The committees were volunteer working groups composed of influential government officials and community leaders, who planned and implemented local publicity and outreach activities which would—

- Make everyone in the community aware of the 1990 census.
- Motivate everyone to participate in the census by appealing to self-interest and explaining the purpose and importance of the census to the community.

Each CCC's activities enhanced the Bureau's outreach and publicity efforts by spreading the census message directly to the local community, using other local structures where applicable. CCC's mailed census publicity materials to community organizations, civic groups, and churches; arranged and developed localized census PSA's and appearances on television and radio talk shows; solicited local newspapers to feature community leaders promoting participation in the census; scheduled special activities and events to promote the census; and designed and distributed leaflets, posters, and handouts throughout the census area. No formal evaluation was ever done.

Between January and September 1989, the Bureau sent to all 39,000 general-purpose governmental entities a *Government Promotion Handbook* (guidelines for active involvement in promoting the census), *The Phoenix Plan* (the "how to" manual for local governments), an introductory letter, and a complete-count program participation response form. If the highest elected official answered favorably, the RCC made contact and relayed any additional information needed to begin a CCC. CAPP staff were available for any assistance in this process.

About 350 cities were visited at least once—27 key cities, 324 other cities, and 2 cities added to the original program; 306 mayors (87 percent) appointed one or more liaisons to serve, and liaison visits were reported for 36 cities. Table 3 reflects the final tallies of complete-count committees as of June 1990.

**Table 3. Complete-Count Committee (CCC) Responses**

| Region/State                    | Total responses | Actual CCC's formed | Jurisdictions used existing structures | Responded "No" |
|---------------------------------|-----------------|---------------------|--|----------------|
| <b>United States</b> .....      | <b>9,788</b>    | <b>2,201</b>        | <b>3,391</b>                           | <b>4,196</b>   |
| <b>Atlanta</b> .....            | <b>529</b>      | <b>261</b>          | <b>172</b>                             | <b>96</b>      |
| Alabama .....                   | 205             | 124                 | 47                                     | 34             |
| Florida .....                   | 146             | 57                  | 61                                     | 28             |
| Georgia .....                   | 178             | 80                  | 64                                     | 34             |
| <b>Boston</b> .....             | <b>833</b>      | <b>201</b>          | <b>315</b>                             | <b>317</b>     |
| Connecticut .....               | 56              | 9                   | 26                                     | 21             |
| Maine .....                     | 131             | 20                  | 38                                     | 73             |
| Massachusetts .....             | 97              | 14                  | 57                                     | 26             |
| New Hampshire .....             | 66              | 11                  | 22                                     | 33             |
| New York State .....            | 437             | 134                 | 152                                    | 151            |
| Rhode Island .....              | 8               | 4                   | 3                                      | 1              |
| Vermont .....                   | 38              | 9                   | 17                                     | 12             |
| <b>Charlotte</b> .....          | <b>521</b>      | <b>139</b>          | <b>223</b>                             | <b>159</b>     |
| Kentucky .....                  | 115             | 30                  | 43                                     | 42             |
| North Carolina .....            | 164             | 34                  | 80                                     | 50             |
| South Carolina .....            | 73              | 22                  | 30                                     | 21             |
| Tennessee .....                 | 95              | 36                  | 35                                     | 24             |
| Virginia .....                  | 73              | 16                  | 35                                     | 22             |
| Washington, D.C. ....           | 1               | 1                   | 0                                      | 0              |
| <b>Chicago</b> .....            | <b>1,462</b>    | <b>300</b>          | <b>411</b>                             | <b>751</b>     |
| Illinois .....                  | 574             | 108                 | 155                                    | 311            |
| Indiana .....                   | 348             | 60                  | 64                                     | 224            |
| Wisconsin .....                 | 540             | 132                 | 192                                    | 216            |
| <b>Dallas</b> .....             | <b>507</b>      | <b>193</b>          | <b>158</b>                             | <b>156</b>     |
| Louisiana .....                 | 86              | 36                  | 31                                     | 19             |
| Mississippi .....               | 76              | 31                  | 24                                     | 21             |
| Texas .....                     | 345             | 126                 | 103                                    | 116            |
| <b>Denver</b> .....             | <b>1,406</b>    | <b>224</b>          | <b>441</b>                             | <b>741</b>     |
| Arizona .....                   | 36              | 18                  | 17                                     | 1              |
| Colorado .....                  | 91              | 26                  | 38                                     | 27             |
| Nebraska .....                  | 327             | 55                  | 97                                     | 175            |
| North Dakota .....              | 521             | 52                  | 148                                    | 321            |
| South Dakota .....              | 330             | 40                  | 103                                    | 187            |
| Utah .....                      | 67              | 20                  | 28                                     | 19             |
| Wyoming .....                   | 34              | 13                  | 10                                     | 11             |
| <b>Detroit</b> .....            | <b>1,068</b>    | <b>127</b>          | <b>358</b>                             | <b>583</b>     |
| Michigan .....                  | 377             | 15                  | 175                                    | 187            |
| Ohio .....                      | 621             | 97                  | 165                                    | 359            |
| West Virginia .....             | 70              | 15                  | 18                                     | 37             |
| <b>Kansas City</b> .....        | <b>2,136</b>    | <b>463</b>          | <b>786</b>                             | <b>887</b>     |
| Arkansas .....                  | 174             | 72                  | 58                                     | 44             |
| Iowa .....                      | 280             | 110                 | 153                                    | 17             |
| Kansas .....                    | 420             | 58                  | 107                                    | 255            |
| Missouri .....                  | 369             | 79                  | 104                                    | 186            |
| Minnesota .....                 | 738             | 105                 | 309                                    | 324            |
| Oklahoma .....                  | 155             | 39                  | 55                                     | 61             |
| <b>Los Angeles</b> .....        | <b>106</b>      | <b>59</b>           | <b>29</b>                              | <b>18</b>      |
| Los Angeles, California .....   | 59              | 33                  | 15                                     | 11             |
| San Francisco, California ..... | 47              | 36                  | 14                                     | 7              |
| <b>New York</b> .....           | <b>87</b>       | <b>20</b>           | <b>47</b>                              | <b>20</b>      |
| New York City .....             | 69              | 18                  | 31                                     | 20             |
| Puerto Rico .....               | 18              | 2                   | 16                                     | 0              |
| <b>Philadelphia</b> .....       | <b>891</b>      | <b>161</b>          | <b>353</b>                             | <b>377</b>     |
| Delaware .....                  | 20              | 4                   | 6                                      | 10             |
| Maryland .....                  | 65              | 35                  | 15                                     | 15             |
| New Jersey .....                | 128             | 35                  | 50                                     | 43             |
| Pennsylvania .....              | 678             | 87                  | 282                                    | 309            |
| <b>Seattle</b> .....            | <b>242</b>      | <b>53</b>           | <b>98</b>                              | <b>91</b>      |
| Alaska .....                    | 13              | 2                   | 9                                      | 2              |
| Hawaii .....                    | 6               | 4                   | 2                                      | 0              |
| Idaho .....                     | 68              | 18                  | 31                                     | 19             |
| Montana .....                   | 53              | 5                   | 23                                     | 25             |
| Nevada .....                    | 17              | 11                  | 5                                      | 1              |
| Oregon .....                    | 85              | 13                  | 28                                     | 44             |

Each CCC consisted of an appointed committee chairperson and other members who were well respected and influential among their communities. Members served from April 1989 through June 1990. Many times the highest elected official chose a staff member as his/her government's liaison between the RCC and the committee. Duties entailed administrative functions such as meeting logistics, typing, filing, mailing, and so forth. Once the highest elected official established the committee (June 1989 to September 1989), members organized and planned (July 1989 to October 1989).

CCC's were organized at either the local or State level. They would usually be divided into subcommittees based on the activities that the committee undertook. Each subcommittee (a religious subcommittee, an educational subcommittee, a media subcommittee, and so on) also had a chairperson who reported progress to the government liaison at a scheduled status meeting. The committees publicized their efforts to support the census; press releases announcing the formation of the CCC's had the community's name, the highest elected official's name, and the names of the committee members. News articles, texts of speeches, copies of promotional materials, and activity calendars were examples of items used in the documentation sent to the RCC's. The local governments also forwarded copies of any final reports.

The State of Maryland organized an active promotional program for the 1990 census. Spearheaded by the Office of Planning, Maryland established a State Complete Count Committee in the fall of 1989. The cochairs were appointed by the Governor, and the members consisted of influential media, business, labor, nonprofit, minority, ethnic and community leaders. The Governor and the State CCC encouraged the formation of local committees; ultimately all 23 counties, Baltimore city (see below), and 11 other jurisdictions participated. Stressing the message that the census was important, easy to complete, and safe, the State organized a promotional parade in May 1989 in Chestertown, near the country's first center of population as determined by the 1790 census. The publicity and outreach campaign distributed bumper stickers, posters, and buttons throughout the year, prepared and disseminated press releases, radio and television announcements, and brochures, and publicized the census at State and local fairs, rallies, and through public displays and contests.

Maryland also developed a census awareness and outreach program targeted at State employees and their clients. State agencies designated census coordinators who identified key supervisors and contact people responsible for coordinating training and information dissemination in their organizations. More than 5,000 State employees having direct contact with the public were trained as census "ambassadors" and instructed to encourage their clients and the public to answer the census. Census coordinators were also responsible for informing current

and retired State employees about the importance of responding to the census and conveying a positive census message to clients, family members, and friends.

In Baltimore, MD, the mayor, city officials, and State legislators were all key players in the city's census awareness campaign, aimed at informing residents of the importance of the count. The city spent approximately \$90,000 for efforts that included producing promotional material and census videos and planning media and public events. The census message was transmitted across the city's neighborhoods through a network of city agencies, local volunteers, the media, and community groups.

One of the major components of Baltimore's campaign was the distribution of promotional materials. The city created its own materials that included posters, handbills, stickers, and information kits. Social service agencies that dealt with the community were the primary distributors. Representatives from these offices served as "ambassadors" and were assigned specific neighborhoods in which to promote the census by attending community meetings and passing out promotional items. Additionally, city social workers, city planners, and building inspectors distributed materials to the residents they encountered. City workers also staffed questionnaire assistance centers located throughout the city. Census videos were also produced for broadcasting at a variety of outlets throughout the city. Videos were aired at hospital waiting rooms, visitors' areas at city jails, and welfare and social security offices.

Baltimore officials furthered the efforts of their campaign by appearing on various media programs and planning several public events. Local politicians and the mayor's census coordinator were interviewed on several radio and television talk shows. The city also hosted many community events, including census rallies and a "homeless breakfast," to raise public support for participation in the census.

In Fairfax County, VA, the county board of supervisors established a CCC to handle a census outreach campaign for the surrounding community. The committee was made up of residents and community leaders who worked with local organizations to promote the need for a full count. In early 1990, several months before Census Day, the CCC launched its campaign.

The committee completed a wide variety of activities, making every effort to inform the county's residents about the importance of the census. Over the several months of its campaign, the committee distributed promotional materials to county offices, businesses, and residents, had census flyers mailed with 300,000 county vehicle registration renewal notices, and promoted possible temporary employment opportunities. Activities in conjunction with the county government included periodic press releases on census topics from its Public Affairs Office, participation by county officials in the census local review programs, establishing a group of county employees to assist the committee in targeting residents that received specific county services, and the production of a videotape by the Public

Affairs Office and the Department of Consumer Affairs that was broadcast on local cable channels and shown at committee presentations.

**State Data Centers (SDC) and State Coordinating Committees**—The SDC project was a Federal/State/local cooperative program that the Bureau began in 1978, as a voluntary arrangement in which all 50 States, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands ultimately participated. Active participants included 201 State agencies or university research centers and over 1,200 local or regional organizations. The Bureau provided statistical publications, maps, subscriptions, computer tapes and diskettes/compact discs, access to an electronic bulletin board, and basic product training. (See ch. 10.) In return, the SDC's agreed to make a good-faith effort to treat the data products as a public resource. They maintained libraries of Census statistics, issued newsletters and press releases, sponsored workshops, responded to their constituents' data requests, and advised on the design of statistical products. During the 1990 census, the SDC or another existing State agency assumed responsibility for census promotion and outreach. Sometimes the State government formed a special committee, usually composed of representatives from some or all State agencies as well as members of private-sector organizations, to coordinate a publicity campaign for the census.

The range of promotional projects engaged in by SDC's and other coordinating committees was wide. Almost all distributed census materials, including posters, buttons, and census education packets, to State and local government offices, businesses, schools, and special-interest groups and asked their help in spreading word of the importance of the census to their constituents. Through such means as newsletter articles, presentations at meetings, speaking engagements, contacts with media, appearances at conferences and conventions, and post-census followup programs (such as the "Were You Counted?" mailouts), the SDC's were able to publicize the census directly and encourage other associations to contribute to census promotion themselves.

Whether run by the SDC or by an ad hoc interagency committee, State census promotion was generally organized in a hierarchical manner. In most cases, the Governor's Office authorized the promotional committee to decide how to approach a publicity campaign. The committee then divided into subcommittees, each with a specific focus (for instance, education, minorities, business, government, and the media). In addition to concentrating on the different aspects of outreach, the committee provided technical support to other State agencies and local governments.

The Bureau gave the SDC's camera-ready copy of promotional items that they could customize for use in their States (the communicators' kit). Many of them used these as the basis for their promotional materials (posters, leaflets, buttons, calendars, balloons, bumper stickers, pencils, etc.). Many of these items were developed months before the CPO-produced materials were available.

In addition, the Bureau provided all of the SDC lead agencies with quantities of every poster and leaflet that CPO produced. On the eve of the census (or as much as a week after Census Day in some cases) each SDC got 30 to 40 boxes of bumper stickers, buttons, plastic bags, key chains, and pencils. Some of the SDC's felt that this was too late to try to distribute these materials, so they gave them to nearby census district or regional offices.

The Governors' backing proved vital to the census promotional process in many States, as they used their power and influence to create State committees responsible for outreach campaigns. In other cases, Governors' offices lent support to campaign organizers' activities or even introduced promotional projects on their own. The offices assisted the media campaigns and sent appeals to State agency employees and local officials to participate in and help promote the decennial census. In some instances where there was no State support, city officials initiated their own campaigns.

Virtually every State involved in promoting the 1990 census invited and received the support of various local groups. State agencies in many instances organized and directed the activities of county and municipal officials, school systems, and city governments, in an effort to extend census promotional campaigns to the local level. In a few cases, local governments undertook outreach campaigns without the active help of the State.

The range of projects to involve local officials and community organizations in census promotion was broad and varied from State to State. Mayors and city commissioners in several States were encouraged, often by a letter from the Governor, to participate in local review (see ch. 6); SDC's commonly offered training sessions for this program.

Believing that children could be a good means of conveying census information to their parents, the promotional committees stressed census education to local school systems. Some SDC's (such as Connecticut's) customized the census education kit to their own State's needs, and others gave schools posters, buttons, stickers, and similar census-related items for inclusion in their curriculum.

Given the vast number of people who could be reached by newspaper, radio, and television exposure, almost every State utilized the media for a census publicity campaign. Promotional organizers in data centers, Governors' offices, and State and local agencies attempted to inform their States' populations about the census through a variety of means, including PSA's, press releases, and radio and television interviews and programs.

In most States, racial and ethnic minority populations, undercounted in previous censuses, were considered to be hard to enumerate. Therefore, SDC's and other census promotional committees focused considerable attention on reaching minorities through various means. As part of the targeting effort in several States, census materials in Spanish and other languages were designed and disseminated in appropriate areas. In addition, some SDC's became involved in the creation of State-level CCC's to encourage



participation and promote the census. Following are just two examples of State CCC programs: The Governor of Georgia, through the State reapportionment committee, created "Operation Get Counted," which was the statewide CCC; the legislature appropriated approximately \$30,000 to help publicize and promote the census. The State of Michigan established an interagency task force to promote the census. Some of its outreach activities included publicizing the census in each office newsletter, airing census messages on closed-circuit television, inserting reminder notices with employee checks, and printing census logos on agency envelopes.

**Tribal and Alaska Native Village Liaison Programs—**Recognizing the special relationships of American Indian tribes and Alaska Native villages to the U.S. Government, these Field Division programs' purpose was to achieve an accurate count that also would help tribal and village officials plan for the well being and growth of their communities. The main program themes were commitment, cultural sensitivity, communication, and consultation. To this end, the Bureau invited each tribal and village government to designate one member to serve as a liaison to the 1990 census.

In 1980, a few tribes had liaisons working on the census, but there was no formal tribal liaison program (TLP). This experience confirmed the need for and usefulness of one. A prototype was first tried during the 1986 test census of east central Mississippi, which included the Choctaw Reservation and trust lands. After the 1986 census, the TLP was revised for the 1987 test census of north central North Dakota. This included the Turtle Mountain Reservation and trust lands and the Fort Totten Reservation. The TLP was further revised and carried out during the 1988 dress rehearsal, which included the Colville and Spokane Reservations in eastern Washington.

In March 1987, the Census Bureau asked each federally and State recognized tribal and village government with a land base to select a tribal liaison. RCC staff followed up with nonresponding governments. Each liaison received training and educational and promotional products, and used them to inform tribal and village officials and community members about the program and the 1990 census.

The TLP and ANVLP (Alaska Native Village liaison program) incorporated both outreach and operational activities:

- Advising the community about the census process, data collection procedures, and uses of census data.
- Advising the Bureau about opportunities for possible presentations at community events.
- Referring tribal and village members for census jobs.
- Distributing recruitment and promotional materials.
- Advising the Bureau about effective media for message delivery.
- Assisting in resolution of problems affecting the census.

The liaisons' primary Bureau contacts were through the CCAS's, who were regionally based. Over all 13 regions, 29 specialists worked with the liaisons. The final count of liaison appointments was 328 out of 360 tribal governments, and 203 out of 228 Alaska Native villages. The Bureau did not hire or fund the liaisons, but did provide them with resource materials and training workshops to familiarize them with the TLP training process. The *Tribal Liaison Program Resource Manual* focused on why and how the census was taken, its timing, and how the data were used in programs that affected the AIAN communities. Specific issues covered in the resource manual were (1) A historical overview of the decennial census and its relationship to American Indians/Alaska Natives, (2) Census Bureau policy, (3) Bureau organization, (4) district office operations, (5) enumeration procedures, (6) census geography, (7) questionnaire content, and (8) the tabulation and publication program. The tribal liaisons received the resource manual for review between January and through March 1989.

The training process for the TLP also included the *Tribal Liaison Program Training Guide*, which the CAPP staff used in training workshops for tribal liaisons, and the *Tribal Liaison Program Workbook* and *ANVLP Workbook* developed specifically for those participating in the 1990 TLP and ANVLP activities training workshops. These workshops gave liaisons information designed to encourage tribal participation in the census (March through May 1989) and census data training designed specifically for the American Indian and ANV population (July through September 1989).

**Regional Elected Officials Meetings—**Between October 1988 and November 1989, the Bureau held 19 outreach meetings with local officials to involve them in the 1990 census. Total attendance was 1,853, with an average of 98 people per meeting. (See table 4.)

Based on the belief that it needed to share its views on some of the key census issues, the staff had decided in 1988 to hold a series of regional meetings to which it would invite mayors, city managers, county executives, and other city and county officials, including those from smaller cities—those between 2,500 and 10,000 people. Some limit on city invitations was necessary because there were usually far more cities than counties in the given region and more than could be accommodated at a meeting of a reasonable size. The 1-day meetings, in a series of 20, would inform local officials about plans for the upcoming census and encourage cooperative efforts to achieve a complete and accurate census count. A contractor, selected primarily for its extensive experience in working with local governments, planned and coordinated the meetings under Bureau direction.

Since the Bureau did not cover participants' expenses, it chose meeting sites balanced geographically within driving distance of most invitees. The most important determinant in picking the sites, however, was the willingness and availability of a mayor to host and make a welcoming

speech at the meeting and the host city's willingness to help sponsor some of the events. Several cities targeted for meetings were passed over because their mayors were not interested in hosting or were slow in responding to invitations.

Invitation target areas, usually encompassing several States, were established for each meeting based on population densities, areas needing to be covered, preferences of host mayors, and comments from census RCC's.

The Bureau mailed invitations and brochures to the chief elected county officials and mayors. These were followed up with phone calls by the contractor, sometimes supplemented by calls from RCC's, statewide associations, regional councils, and host cities. Not all the attendees were mayors or county chief elected officials. Attendees also included planning directors, administrative assistants, city or county clerks, city or county managers, economic development officials, research specialists, finance officials, and so on. About a third of all attendees were elected or senior appointed officials from cities or counties; a little more than a third were other city or county representatives, and a little less than a third represented States, regional councils, American Indian tribes or Alaska Native villages, school districts, or private organizations.

Mayors of the meeting sites were cohosts, joined in some cases by officials from statewide associations of local governments, and in one case, a Governor. The cohost role was more than a formality. In addition to their personal participation in the meetings and commitment of city staff time to planning and implementation, most host mayors took a lead role in raising private donations to cover the cost of the reception, luncheon, and other hospitality. Sites, dates, and attendance at the meetings were as follows:

Table 4. 1990 Census Outreach, Regional Elected Officials Meetings

| Site                   | Date    | Attendance |
|------------------------|---------|------------|
| Total.....             |         | 1,853      |
|                        | 1988    |            |
| Kansas City, MO.....   | Oct. 19 | 94         |
|                        | 1989    |            |
| Meridian, MS.....      | Mar. 16 | 65         |
| Galveston, TX.....     | Apr. 26 | 133        |
| Binghamton, NY.....    | May 10  | 58         |
| Anchorage, AK.....     | May 17  | 40         |
| Oklahoma City, OK..... | June 8  | 105        |
| Indianapolis, IN.....  | June 8  | 146        |
| Lansing, MI.....       | June 13 | 172        |
| Baltimore, MD.....     | June 27 | 68         |
| Atlanta, GA.....       | June 30 | 140        |
| Trenton, NJ.....       | July 14 | 121        |
| San Juan, PR.....      | July 21 | 170        |
| Duluth, MN.....        | Aug. 2  | 63         |
| Gastonia, NC.....      | Aug. 25 | 110        |
| Cleveland, OH.....     | Oct. 11 | 73         |
| San Francisco, CA..... | Oct. 13 | 75         |
| Phoenix, AZ.....       | Nov. 8  | 114        |
| Denver, CO.....        | Nov. 14 | 59         |
| Tacoma, WA.....        | Nov. 16 | 47         |

Nearly 96 percent of the evaluation respondents felt the meeting fulfilled their expectations, and virtually all stated

that additional meetings were "highly recommended" (84 percent) or "recommended with modifications" (16 percent). Only 1 of 412 evaluation respondents opposed further meetings of this type. Most participants seemed to leave the meetings ready and willing to work with the Bureau for a good 1990 census.

Evaluators felt that the basic approach for outreach to local officials in these meetings had been very effective, and should be incorporated in similar future efforts. These included active cosponsorship by host-city mayors; the excellent opening presentations by skilled, senior Bureau headquarters officials; and the local officials' discussion panel. Some modifications to improve the approach were also in order: A more structured post-meeting work program, a modest increase in attendance, and expanded cosponsorship.

### Special Projects

**Census Education Project (CEP)**—DUSD's<sup>9</sup> 1990 CEP involved elementary and secondary educators in the census by giving them innovative, interdisciplinary teaching materials that would introduce students and their families to the census. In addition to teaching about the census and census data, the project suggested ways to help generate community awareness and stimulate household response. In some households (such those in which the adults were non-English speakers), students might assist in completing their families' census forms. There had been an education project for the 1980 census (two kits, grades 4-6 and 7-12), but it was little used and few were aware of it.

The main component of the 1990 project was a teaching kit prepared in the Bureau and initially sent to each elementary and secondary school in the country. The kit consisted of a package of reproducible lessons and activities that teachers could use in their classrooms. There were 10 exercises (3 also in Spanish) with reproducible student worksheets suitable for use in kindergarten through grade 12, primarily in the social studies, mathematics, science, and language areas. An educator's guide offered background information and suggestions for how and when to use the kit, and a leaflet listed ideas for school activities designed to increase community and parental awareness of the census, such as poster contests, media campaigns, and historical exhibits.

There also was a supplement to the kit, called "1990 Census: Celebrate Me! Celebrate You! Celebrate U.S.!", primarily for junior high and high school students. It introduced students and educators to a facsimile of the basic 1990 census household questionnaire; offered information on the race, ethnicity, and ancestry questions and various aspects of census-taking; and suggested a variety of community awareness activities for educators and students.

The original kit components were sent to print in September 1988 and the final assembled kit was ready in January 1989. In all, 224,000 final kits were in the first

<sup>9</sup>Planning for the CEP began in DPLD, then changed to DUSD.

printing. In the last week of March 1989, a kit was mailed to each elementary and secondary school principal in the country and to school district superintendents. This mailing totaled 125,000 kits. At the same time, PIO announced the project and the kit distribution by a press release to key national newspapers and approximately 250 national and State education offices, associations, media outlets, and vendors. The CCAS's across the country had 43,000 kits for subsequent distribution to educators in census high interest areas (CHIA's). The remaining 50,000 copies at headquarters were a resupply source for CCAS's, telephone and direct mail requests, and national education association exhibits.

As a result of rapid, positive response to the project, it was evident by mid-summer 1989 that demand would quickly exceed the existing supply. In November 1989, the Bureau reprinted another 150,000 kits. During this same time, the staff published a 16-page supplement to the main teaching kit (focused around the 1990 census basic questionnaire) in English and in Spanish. In total, 150,000 copies of the English and 65,000 copies of the Spanish supplement were produced. For example, the Mexican American Legal Defense and Education Fund (MALDEF), its regional community education campaign, and its national media campaign (enlisting the support of such national organizations as the National Education Association, the Council of Chief State School Officers, the National Association of Latino Elected and Appointed Officials (NALEO) and the U.S. Catholic Conference) led the way in producing and distributing approximately 2 million bilingual informational materials, and in coordination with the Bureau, distributed the 1990 CEP kits in the CHIA's.

Of the 150,000 CEP reprint teaching kits, 107,000 were shipped directly to the RCC's for ongoing distribution to schools and educators, primarily in CHIA's or working with high-interest population groups. This shipment to the regions was based upon the number of schools and the extent of CHIA's in the region. This distribution model also was used in shipping 107,000 copies of the English supplement to regions. The dissemination of 57,000 copies of the Spanish supplements to regions was based upon a guaranteed minimum of 1,000 copies per RCC, but, more importantly, was based upon the 1988 estimates of the Hispanic population by State. Therefore, California, for example, with an estimated one-third of the Nation's Hispanic population, received one-third of these supplements.

**Census Education Project Promotion**—The success of this project did not hinge solely on the distribution of teaching kits to the Nation's schools and followup with CHIA districts and educators; broadly based promotion also was required. To that end, the Bureau sought and received the endorsement, support, and spin-off promotion and product development of numerous national educational associations, educational media outlets, and private vendors of educational materials.

**Press releases**—As the 1990 CEP teaching kit was being prepared for delivery in March 1989, the Bureau announced the project and the planned distribution by a

press release to key national newspapers and approximately 250 national and State education-related government offices, associations, media outlets, and vendors. An additional press release in November 1989 again called attention to the project and its teaching components through the communication vehicles of these same groups.

**National exhibits**—Between 1985 and 1990, the Bureau worked directly with about 50 education organizations to stimulate their support of this project and its promotion to their constituents. The Bureau directly promoted the project and the census through exhibits, presentations, and workshops at the conferences of nearly 20 of these organizations, for example, the National School Boards Association, Teachers of English to Speakers of Other Languages, the National Council for the Social Studies, the National Indian Education Association, the National Association for Bilingual Education, the National Education Association, the National Indian Education Association, the National Council of Teachers of Mathematics, and the American Federation of Teachers.

**Census workshops**—The Bureau supported and/or participated in privately sponsored teacher training workshops on the census and the CEP. Requests for materials and/or special presentations were received from groups such as the American Statistical Association, the Constitutional Rights Foundation, the National Geographic Society, the Social Science Education Consortium, and various newspaper-in-education groups.

**Education media/association publications**—Throughout 1989 and early 1990, the Bureau sought the production of special stories, focus sections, and general coverage about the census and the CEP by the education media and education associations. In addition, adaptations and reprints of CEP kit components also were solicited. Some of the organizations that responded were the American Federation of Teachers, *Big Picture* magazine, C-SPAN and the Discovery Channel (cable television), the Children's Television Workshop, the Commission on the Bicentennial of the U.S. Constitution, the *Fresno Bee*, Good Apple, Inc., *Instructor* magazine, *Junior Achievement*, the Knight Ridder Newspaper-in-Education Managers Group, the National Council for the Social Studies, *Philadelphia Inquirer*, Scholastic, Inc., *Science World* magazine, the Smithsonian Institution, the *Mini-Page*, TI-IN Educational Satellite Network, and the *Weekly Reader*.

**Special events and contests**—The Bureau also solicited the development of contests and special events for students and teachers. Some responses were: The National Association of Hispanic Journalists held a writing contest for students, TRU-VU International conducted a contest for teacher-generated census/geography lessons, and the National Council of Teachers of Mathematics used the 1990 census to kick off Math Month (April 1990).

**Related instructional materials**—As work progressed on the CEP, it became evident that additional census-related instructional materials were available or being developed by private education vendors in the areas of mathematics, science, social studies, and multicultural education. The

Bureau recognized the importance of (1) alerting classroom teachers to the presence of these materials as complements to the 1990 CEP materials and (2) recommending to these vendors that they promote their "census" products. Some census educational materials vendors were the Active Learning Systems, Ayer Company Publishers, the Consortium for Mathematics and Its Applications, Great Lakes Software, Macmillan Publishing, the National Geographic Society, Newsweek, Inc., the Pennsylvania Ethnic Heritage Studies Center, Perfection Forms, the Population Reference Bureau, Rand McNally Inc., Social Issues Resource Series, TRU-VU International, Inc., World Eagle, Inc., and Harcourt, Brace, Jovanovich.

**The Census Education Project: College Edition**—DUSD developed this project in conjunction with the nationwide commemoration of the bicentennial U.S. census in 1990. The objectives here were to increase interest among educators and students in census-related products and services, to give instructors materials that demonstrated how census products were useful in a variety of disciplines, and to encourage educators and students to recognize and participate in the events surrounding the census.

The materials furnished were teacher-ready activities to facilitate classroom discussions pertinent to their fields. The packets included numerous graphic illustrations designed to be transferred to overhead transparencies for classrooms, student exercises in the form of reproducible worksheets, and answers and discussion guides for instructors.

The first packet of activities focused on disciplines in the social sciences. Although the topics listed on the back panel cover were illustrative of interests among those in the social sciences, they were to be useful educational tools for a much broader audience. The Bureau hoped to publish similar packets directed at different college disciplines (e.g., business, math and science, agriculture, humanities, home economics) in the future. Due to lack of funding and staff, the project was canceled.

**University Initiative**—Bureau executive staff and/or senior managers visited historically Black colleges and universities (72) throughout the country from October 1986 to May 1987. The purpose of these half-day meetings with the presidents and other appropriate college officials was to—

- Establish a mutually beneficial relationship with the president, the school, and the community.
- Familiarize the college with the Bureau, its mission, ongoing surveys and censuses, and especially the decennial census.
- Emphasize the Bureau's relationship to the minority community, and how it could use the data collected and tabulated to identify the undercount problem faced in minority communities.
- Become familiar with their resources, such as academic programs, faculty members, students, and graduates; in particular how they might participate in the Bureau's employment opportunities, cooperative programs, and student internships.

- Identify what the Bureau could do to help them—e.g., how its data could be valuable to them and how to obtain and use the tabulations.
- Obtain their endorsement, ideas, commitment, and involvement in the Bureau's 1990 outreach efforts.

In October 1986, the president of Atlanta University wrote a letter introducing the Bureau to the schools. FLD then sent another letter that outlined the Bureau's interest and purpose of visiting the schools and named a liaison. Two weeks later, the liaison was expected to telephone the schools to arrange a mutually agreeable date for the visit.

A member of the Information Services Program (ISP) from headquarters or from one of the regional offices accompanied each liaison person. ISP staff followed up and were expected to—

- Report any information that they had about the school, such as whom they knew or what those persons knew about the school.
- Maintain files of any scheduled visits and ensure that followup visits or phone calls took place. (ISP staffers maintained contact with the schools at least once a year through 1990. This contact was by an initial phone call, and, if the school and the Bureau agreed, the ISP or others made another personal visit.)
- Identify any job openings, if applicable, in the regional office and prepare a list. In addition, find out where the DO's and PO's for 1990 were and the potential number.
- Compile a list of names and phone numbers for data user seminars, acquiring data, and employment information.

**Public Housing Initiative**—Field Division established this project to increase census awareness and participation among public housing tenants by providing them with census information and materials through national organizations and their affiliates.

The Bureau participated in the annual conferences of national organizations such as the National Tenants Organization, the National Association for Tenants of Public Housing, the Council of Large Public Housing Authorities, and so on, by meeting with the boards of directors, staffing an exhibit booth, and conducting workshops. A total of 176 public housing authorities were involved in the campaign.

The Bureau identified large public housing complexes across the Nation. It also hired complex residents for the month of March for outreach 2 weeks prior to delivery of the questionnaire (urban update/leave operation) and to hand-deliver the questionnaire and assist in completing it, as appropriate. The RCC's CAPP staff trained enumerators in the promotional and questionnaire assistance activities.<sup>10</sup>

<sup>10</sup>See 1990 Decennial Census Informational Memorandum No. 95, Operation Requirements Overview: 1990 Urban Enumeration, November 8, 1988.

**Religious Organizations Project**—This DPLD project utilized the outreach capabilities of religious organizations to promote participation in the census among their members. Three major audiences were targeted—the general population, through the mailing of religious “talking points” to churches nationwide; the Black population, through a partnership with churches and selected fraternities; and Hispanics, through a partnership with the Secretariat of Hispanic Affairs of the National Conference of Catholic Bishops.

DPLD purchased a list of 392,169 churches and, in February 1990, mailed each one a booklet, “What Your Congregation Should Know About the 1990 Census.” This booklet, prepared by the CPO, contained five census messages suitable for reading aloud.

Also, CCAS’s worked with local places of worship and religious organizations to publicize the census in their bulletins and newsletters, speak about the census during religious services, distribute census educational and publicity materials, provide space for walk-in questionnaire assistance centers, and recruit for census jobs.

Headquarters staff also met with major religious media to encourage census support through their communications channels.

**Catholic Church Project**—In November 1988, the Bureau asked the Bishops’ Committee for Hispanic Affairs of the National Conference of Catholic Bishops for assistance in enumerating Hispanics. An official proposal was formally presented in January 1989, in Venice, FL. To accomplish this task, a joint U.S. Catholic Conference (USCC)-Bureau committee identified three strategies needed to reach the Hispanic community: (1) communication, (2) promotion and education, and (3) recruitment.

The committee believed that an implementation plan addressing these three areas would ensure the successful enumeration of the U.S. Hispanic population. The Bureau sponsored two workshops, one on June 8-10, 1989 in Arlington, VA, and the other on September 21-23, 1989, in Albuquerque, NM, with the Secretariat and diocesan directors. They identified methods for reaching the Hispanic community through 137 dioceses with predominantly Hispanic populations and discussed the three strategies above.

The Secretariat (1) notified parishes of the partnership, (2) promoted the census through archdioceses, dioceses, and parishes, (3) distributed census promotional and educational materials through the church’s Encuentro network, (4) identified volunteers and church space for census volunteer questionnaire assistance centers, and (5) encouraged parochial schools to use the Census Education Projects.

The Bureau, primarily through the CAPP, provided recruitment information, educational and promotional materials, and training for volunteer centers.

In addition to the above activities, bishops participated in key Spanish-language video PSA’s directed to Hispanics.

**Black Church Partnership**—This partnership enlisted the assistance of Black churches and fraternal orders in a more complete enumeration of this population. The origin

was a meeting in October 1987 between the Bureau director and the founder and former president of the Congress of National Black Churches, an interdenominational organization.

In 1988, two conferences, each attended by representatives of over 30 Black churches and church organizations, resulted in an agreement on the respective roles of the Bureau and the churches. Sixteen organizations issued written endorsements of the census, and circulated these to their member churches and congregations. Among other actions taken were (1) cooperation with CCAS’s by distributing promotional materials, (2) assistance in finding applicants for temporary census jobs, and (3) donation of temporary office space for census worker testing and training, as well as questionnaire assistance. As recommended by conference attendees, Bureau staff, mainly from the NSP, attended partnership members’ conferences and meetings to speak about the endorsement and encourage local-level support. Eventually, staff attended over 16 conferences to make presentations, mount exhibits, and distribute over 300,000 copies each of six kinds of educational and promotional materials.

**Head Start Initiative**—In the fall of 1986, the Census Bureau and the National Head Start Association (NHSA; a nonprofit protection and advocacy organization for children and families) discussed the possibility of a cooperative 1990 census effort. Subsequent discussions that included the Head Start Bureau (a program located within the Administration for Children, Youth, and Families/Office of Human Development Services in the Department of Health and Human Services) resulted in an agreement in principle and an initial plan of action for the 1988 census dress rehearsal. In the 1990 census, participation covered the 50 States, the District of Columbia, the Virgin Islands and Puerto Rico.<sup>11</sup> In 1990, Head Start programs served about 464,000 families. The Head Start Initiative was a joint agreement between the Census Bureau, the Head Start Bureau, and the NHSA to promote the 1990 census through affiliated parents, associations, grantees, centers, and Head Start staff.

The objectives were to—

- Increase awareness of the importance of the census to all Head Start families and employees.
- Allow the Census Bureau to reach segments of the population that were historically undercounted in the decennial census.
- Encourage and assist Head Start families and staff to obtain employment with the census.
- Assist Head Start by providing accurate information for allocation of its funds.

The Bureau agreed to develop and distribute promotional materials, plan and implement a kickoff of the initiative at the NHSA’s 16th Annual Training Conference,

<sup>11</sup>For the complete memorandum of understanding, signed February 3, 1989, see 1990 Decennial Census Outreach Memorandum No. 35.

discuss the importance of the census and recruiting efforts at national and regional Head Start conferences, and provide local contacts and support for grantees and centers. With DPLD coordination, regional and local activities were supported chiefly by the CAPP staff.

The Head Start agencies agreed to formally communicate support to grantees and centers, arrange for workshops, publish articles in their periodicals, display and disseminate promotional materials, arrange for testing of parents seeking census employment, and conduct a telephone campaign. This last activity involved Head Start staff and parents calling parents during one week beginning March 26, 1990, and urging them to send in the census questionnaire.

Between January 12-16, 1990, the Bureau mailed promotional materials to grantees, who in turn delivered them to centers. Materials supplied included motivational brochures, awareness posters, census questionnaire facsimiles, census response guides for the telephone campaign, lists of recruiters, and special posters and flyers designed for this project. Each grantee received over 1,000 promotional items.

**Bicentennial Promotion**—A committee, comprised of representatives from appropriate divisions, planned a multifaceted celebration of the 200th anniversary of the first census in the United States. Examples of the kinds of activities that were to gain extra support for the 1990 census through favorable “spinoff” from the publicity and interest generated by the bicentennial campaign included a commemorative postage stamp, a commemorative medal from the U.S. Mint, a new edition of *Historical Statistics of the United States from Colonial Times...*, a color chart book and an official history, a special film/videotape on the history of the census and the Bureau, a special Smithsonian and/or National Archives’ exhibit and displays in other museums, a special professional conference to mark the anniversary and look ahead, a film/videotape on historic population growth, special bicentennial articles in widely read magazines, and special bicentennial contests with photography and essays. In this period, there was intense competition among Federal agencies wanting to call attention to their own anniversaries through stamps, medals, and the like, and there were overarching events commemorating the bicentennial of the U.S. Constitution. With Bureau energies focused on taking the census, most bicentennial proposals did not get beyond the “idea” stage. The National Archives did have exhibits in Washington and at several regional branches, and DUSD’s *Census and You* newsletter had a bicentennial edition that was widely distributed.

**Migrant Farmworker Project**—The project was to encourage census participation by using the communications networks, credibility, and facilities of national organizations and their affiliates that served migrant farmworkers. Formal commitments were arranged with five such organizations. These were the Association of Farmworker Opportunity Programs, Migrant Health Division—National Community

Health Centers, Farmworker Justice Fund, National Rural Housing Coalition, and the National Association of State Directors of Migrant Education.

DPLD developed and implemented the project. Staff contacted national migrant organizations to secure their formal commitment, attended their national conferences to discuss the importance of the census, distributed promotional materials to local affiliates, and arranged local Bureau contacts for local organizations serving migrant farmworkers. RCC staff did the same at the local level. Promotional materials were mailed to 104 addresses in early February 1990.

## Other Outreach

**Recruitment**—The Recruiting Coordination Staff (RCS) at headquarters, consisting of the Field Division’s recruiting coordinator and support personnel, provided technical direction to each recruiter. The RCS monitored and evaluated their activities for acceptable performance and ensured the consistent application of field recruiting procedures. Additionally, the RCS coordinated with the assistant regional directors, to whom the recruiters reported administratively, on recruiting matters as appropriate.

The RCS regional recruiter analyzed hard-to-enumerate target groups and assisted the recruiters (1 in each of the 449 DO’s and 7 PO’s) in planning recruiting for their respective regions and coordinated the development of materials (flyers, brochures, posters, etc.) used for the recruiting process. Additionally, the RCS was involved in contacting private and public-sector target groups. This activity was coordinated with appropriate Bureau officials and the outreach units(s) at headquarters: CAPP’s 1990 Outreach Coordination Staff, NSP, PIO, CPO, and DOD.

Substantial efforts were directed to print and electronic media placements from January 1988 through August 1990. Classified advertising in national circulation and minority print media, coupled with PSA’s, feature stories, etc., received wide distribution. This was an effective means of generating candidates. Most of the personnel needed to fill the nonsupervisory positions (85 percent of 1990 hiring) of clerk, enumerator, and data transcriber came from these efforts. Word of mouth was an effective no-cost form of advertising.

State employment agencies were contacted from June 1987 through August 1990. Some were willing to provide free space and make the arrangements for testing; however, all tests had to be administered by RCC and district office (DO) personnel.

Headquarters and/or regional staffs contacted national groups and minority organizations with strong local affiliations. Their cooperation was essential because of their potential to provide candidates and free publicity through in-house media that complemented ongoing census promotional programs by reprinting standard census messages. These messages informed potentially interested candidates about census jobs, recruiting, and testing plans.



(See ch. 6 for discussion.) American Indian and Alaska Native governments participated in recruiting and testing through their training and employment programs.

**Questionnaire Assistance Operation**—Multilingual questionnaire assistance was available during the census at district offices and at walk-in centers set up and staffed by community volunteers, and also by telephone as part of the data-collection operation discussed in chapter 6, “Field Enumeration.” Inasmuch as the promotional program had to organize the volunteer effort and also publicize the availability of assistance, these projects are briefly described here.

CCAS’s mentioned these centers in their presentations during site visits, network meetings, etc., as one way that civic and service organizations could help in 1990. This project worked as follows: The donor organization signed an agreement with the Bureau spelling out how, when, and where the volunteer assistance would be offered; the volunteers signed affidavits of nondisclosure and waivers of compensation and reimbursement. They received a simple one-half day training, usually conducted by the CCAS, plus a manual, a question-and-answer reference guide, and some forms they needed to keep track of how many people they assisted and the types of assistance provided. There was some ambiguity at times about who authorized or administered the confidentiality oath, whether the volunteers should be subjected to security checks, and how the Bureau filled remaining gaps in the questionnaire assistance coverage. Furthermore, volunteers were discouraged from filling out the questionnaire for respondents, although in some cases they had to.

Telephone and walk-in assistance centers had blank Spanish-language questionnaires, which they mailed or handed to individuals who gave the housing-unit identification number from the questionnaire they received by mail. (Persons who did not receive a questionnaire in the mail or could not provide the identification number were told an enumerator would visit them.) There also were questionnaire translations in about 30 languages, but the responses had to be entered (in English) on the regular household questionnaire. (As they visited households that did not respond in the census, enumerators likewise carried these translations and the Spanish-language forms as well as the regular questionnaires.)

For the first time, the census had its own toll-free telephone assistance numbers, accessible nationally, in English, Spanish, or any of six Asian languages—Vietnamese, Korean, Cambodian, Chinese (Mandarin and Cantonese), Laotian, and Thai.

**Census Operations Outreach**—To encourage participation in the census, the Bureau added three promotional features to the mailout operation—an Early Alert flyer, a reminder card, and a motivational insert. These are briefly described below; for detail on quantities, timing, etc., see chapters 4 and 6.

*Multilingual Early Alert flyer*—In areas where language and other barriers might make the enumeration difficult, the

Bureau mailed a flyer before sending the census questionnaire itself. This new effort for 1990 contained multilingual messages (English, Spanish, and six Asian languages) about the importance and confidentiality of the census and alerted householders that a questionnaire would be in the mail soon. They would be asked to fill it out and mail it back, and there would be information about how to get help in completing it.

*Mail reminder card*—Results from the test censuses showed that reminder cards could improve return rates enough to justify the cost of using them. Therefore, 2 days before Census Day, the Bureau mailed cards to households, reminding them to complete and return their questionnaires promptly.

*Motivational insert*—Research after the 1980 census reported that some people said the first time they had heard about the census was when the questionnaire mailing package arrived. Thus, the package itself could be considered a promotional vehicle and a critical source of information. In several of the test censuses, the staff included a motivational insert in some of the mailing packages and found that it improved mail-return rates. An outside study, part of the dress rehearsal evaluation, also found very favorable response. Building on the earlier experience, the insert used for 1990 had colorful graphics and listed reasons to be counted in the census.

## THANK YOU AMERICA PROGRAM

This program acknowledged the assistance that outside individuals, organizations, and their employees contributed to the census. During phase I (summer 1990-spring 1992), staff distributed crystal bowls, plaques, and certificates of appreciation. During phase II, in January 1991, the Bureau mailed final population counts to the highest elected officials of over 39,000 local governmental units, and in phase III, beginning in September 1991, the Bureau mailed the same officials their State’s *Summary of Population and Housing Characteristics* (1990 CPH-1) report.

## EVALUATION PROJECTS

As noted in the preceding sections, the 1990 promotional and outreach program involved a mass-media public-service campaign, joint participation with governments, outreach to national and community organizations, and initiatives with businesses and religious organizations. While the basic thrust of the 1990 campaign was similar to that for 1980, improvements in campaign components played a key role in making the 1990 census a success.

Five major projects evaluated the effects of these efforts: a media audit, an awareness study, an outreach evaluation survey, a mail survey of census participation and a telephone survey of census participation. Also, there were at least five smaller evaluations directed at specific components of the promotion and outreach program.

The census campaign media audit and the awareness study were conducted by an independent, New York-based company specializing in professional advertising planning



and buying and in media reports and evaluations—Vitt Media International, Inc. The Advertising Council, under contract with the Census Bureau, obtained Vitt's services in early 1990. Vitt's primary responsibilities were to audit the Ad Council's PSA airings nationally and to measure census awareness in six media markets.

The Outreach Evaluation Survey's (OES) primary purpose was to measure the impact of promotion, outreach, and the national media campaign. The Bureau's Center for Survey Methods Research (CSMR) did the planning, and permanent Bureau current-program interviewers collected the data. The primary difference between the Vitt Media projects and the OES was that the former mainly measured PSA and news activity and respondent-reported awareness. The OES was concerned with the dynamics of actual census participation as indicated by verified mailback behavior and self-reported attitudes, knowledge, and awareness of the census. Both projects estimated awareness of the census, although the methodologies and scopes differed as described below.

Although not originally included in evaluation plans, in May 1990, the Bureau entered into a joint statistical agreement with the National Opinion Research Center (NORC) of the University of Chicago to survey census participation to see why the mail response rate was lower than expected. The project involved both household interviews and focus groups and addressed hypotheses about mail nonresponse.

These projects are summarized below. For a complete description, see the final reports for each as referenced.

### The 1990 Census Campaign Media Audit

In February 1990, the Bureau launched a promotional campaign designed to make the public aware of the importance of completing and returning census forms. Through the auspices of the Ad Council, PSA materials, including story boards, scripts, and tapes, were mailed to 25,000 media outlets across the country. Their management was requested to run the advertising as often as possible, particularly increasing the frequency during the latter part of March, just prior to the census questionnaire return date (April 1).

Vitt Media audited time and space devoted to census PSA's in 15 types of media from February through May 1990. (Vitt had done a similar audit in 1980.) Judged too insignificant to be audited in 1980, cable television was included for 1990. Also, in recognition of the growing influence and importance of the Asian and Pacific Islander populations, PSA's for Asian media were audited as well. Audited media were—

- Network TV
- Spot TV
- Network cable
- Spot cable
- Network radio
- Spot radio
- Consumer magazines
- Weekly newspapers
- Daily newspapers
- Trade magazines
- Outdoor advertising (billboards)
- Transit/bus shelters
- Black media (newspapers and radio)
- Spanish language media (TV, radio, newspapers, magazines)
- Asian media (TV and newspapers)

The Ad Council's media mailing list, which numbered over 25,000, comprised the universe from which a sample was drawn and contacted by facsimile (fax) and telephone. Independent samples for each media type listed above carried the number of estimated PSA's. The combined sample size came to 1,944. The audit elicited a count of the census PSA's aired with play date and time. Applying standard industry estimation and projection techniques allowed various audience sizes and value indicators.

Highlights of the audit findings<sup>12</sup> were—

- Total dollar value of all census PSA's run from February 1990 through May 1990 was \$66.5 million. This placed the Bureau third among the Nation's top advertisers, behind only McDonald's and Sears, in terms of paid advertising media expenditures for an average 4-month period. (A similar measure taken for the 1980 census campaign found that based on dollar value, it also placed third, behind the two top-10 advertisers, then McDonald's and Ford.)
- Local TV and radio stations were most responsive in running the census PSA's, providing \$45.9 million (69 percent) of total media value.
- Ethnic media, including Black, Spanish language, and API outlets, combined for a major contribution of \$14.0 million (21 percent) of the total media value.
- The PSA campaign reached a potential total audience of 99 percent of the adult population aged 18 or older, with an average of 68 exposures per person.

Although the overall census campaign was judged highly successful by industry standards, the evaluation recommended that the Bureau consider using a paid media campaign in the future for maximum effectiveness in communicating messages to the public.

### 1990 Census Campaign Awareness Study

This Vitt study measured the level of census public awareness among the general population and ethnic and racial groups of interest and how much time and space (and their value) local media contributed to support the PSA campaign. It identified whether relationships between media support existed between markets and whether relationships between media support and public awareness existed there as well. This latter information had never been available to plan census promotion, and was intended to provide guidance to 2000 census planners.

The study was carried out between February and April 1990 in six markets—New York, Los Angeles, Houston, Cleveland, Atlanta, and Minneapolis-St. Paul—chosen for their geographic dispersion, range of racial and ethnic

<sup>12</sup>For a complete description of the audit methodology, including sampling, data collection, and audience and dollar value projection, see the final report from Vitt Media, *1990 Census Campaign Media Audit, February '90-May '90*. (Data tables, questionnaires, statistical tolerances, telephone dialing results, and sampling methods are included in this report as well.)

populations, and local census promotional efforts. The research took place in three waves—at the start, middle, and conclusion of the census campaign. Each wave began with the local market media audit, followed shortly thereafter by a telephone awareness survey. This design was adopted so that census awareness could be related to census PSA and news audience size estimated by the media audit.

In all, 1,183 TV and radio stations, local cable operators, and newspapers were contacted three times to verify the quantity and schedule of PSA's or print ads run. Vitt audited all known TV, cable, radio, and daily and community newspapers; PSA auditing was done by telephone.

In recognition of the importance of the contribution of news to public awareness, Vitt subcontracted to monitor news full-time on all TV stations, cable systems, and newspapers in the six markets. Radio stations were monitored by sampling because of the prohibitive cost of full-time monitoring. These activities estimated audience exposure using gross rating points (GRP's) for adults 18 years of age and older as the indicators.

One subcontracted market research firm, Bruskin Associates, directed household telephone sample-selection and interviewing for the awareness surveys. Its staff drew independent samples for each market and for races or ethnic groups of interest within each market. They sampled the general population, Blacks, Hispanics, and Asian/Pacific Islanders. Three waves of household interviews, each totaling over 2,800 interviews, measured general awareness of the census, whether the respondent had heard anything "recently" about the census, and source(s) of the information. With the exception of the Hispanic sample, which was subcontracted to a specialized Hispanic field service, Interviewing Service of America, Bruskin Associates conducted all interviews.

Assuming that media audience estimates were more valuable as a diagnostic tool if they could be related to some additional measure of advertising campaign effectiveness, such as sales volume or brand awareness levels, the awareness survey served as this additional measure of census promotional campaign effectiveness. Awareness was self-reported and not verified.

Highlights of the findings were—

#### *PSA time and space and news coverage*

- PSA audience delivery was extremely heavy in all markets, with an average of 1,733 GRP's and 2,397 PSA's.
- PSA's delivered an audience which exceeded the total for all Coca-Cola's advertised brands for the same period.
- Overall, PSA's accounted for nearly 75 percent of total GRP's, with the balance from news.

#### *Public awareness*

- Public awareness (unprompted) of the census increased to 93 percent by April 1.

- Overall awareness was virtually the same across all markets.
- Major media awareness (TV, cable TV, radio, and newspapers) was high at the conclusion of the campaign for all groups: General population, 90 percent; HISP, 92 percent; BLK, 85 percent; and API, 84 percent.

Vitt Media concluded that the census campaign was a clear success in terms of media coverage and increased awareness among all population groups. Also, general and media awareness rose within each market as media support increased over the campaign from February through April 1990. For instance, major media census awareness for the general population in the Cleveland, OH, market rose from 47 percent at first measure to 93 percent at the third wave, while PSA delivery rose from 381 GRP's to 1,009. On average, for the six markets, census awareness rose among the general population from 83 percent to 93 percent, while news and PSA GRP's increased from an average of 313 to 1,109.

The study also found some large market differences in major media PSA support of the census. The range was from 928 for the Los Angeles market to 2,324 for New York, for three waves. However, differences in GRP's between markets did not seem to translate into different awareness levels. Vitt Media suggested that a major media awareness threshold was passed in all markets, meaning additional GRP's had little effect on it.

### **1990 Outreach Evaluation Survey (OES)**

This was a Bureau-conducted, nationwide, two-wave survey to evaluate and better understand the impact on participation of its census promotion and outreach, and national media campaign. The questionnaire assessed exposure to the public information campaign, census awareness, knowledge of and attitudes about the census, and questionnaire mailback, which was verified through matching. The 1990 OES replicated much of the content of the 1980 Knowledge, Attitudes, and Practices Survey and the 1980 Applied Behavior Analysis Survey, offering a comparison for the 1990 findings.

The 1990 OES sample design was nationally representative, although it oversampled areas covered by census district offices expected to have the lowest mail response rates. The sample came from census address lists, with two interviews—one in February 1990, at the start of intensive promotional and outreach activities, and the other in late April and early May 1990, at the peak of activities after questionnaires were delivered. Each wave yielded interviews in about 2,500 households. In planning, the staff (chiefly CSMR) followed precedents set by the 1980 evaluations mentioned above. FLD and DOD collected and processed the data, respectively.

The OES was to answer questions such as—

- What was the effect of the overall decennial outreach campaign on census-related awareness?

- Were there significant differences in awareness and attitude levels among identified subpopulations?
- What media were most often cited as sources of census information?
- What was the relationship between census awareness and census participation?

However, the lower than expected mail response to the 1990 census led to another survey to gain broader insights into the mail-return rate decrease. The OES analytical plan changed also, in that OES results were to be analyzed in tandem with those of the new post-census participation survey (see below). The findings pertaining to 1990 census promotion and outreach are summarized there.

### Surveys of Census Participation

**Mail Survey**—In June and July 1990, Bureau staff designed the Survey of 1990 Census Participation (SCP) to determine why the actual mail-response rate (65 percent) was substantially lower than the anticipated rate of 70 percent by evaluating a number of hypotheses about the causes.

The SCP questionnaire contained some items appearing in the OES and the 1980 evaluations; it also broadened the scope of the OES. The project involved a national sample of mail areas in the continental United States. There were 2,478 responding households.

Given the narrow time constraint and the desirability of using an outside research organization to conduct the interviews, the Bureau entered into a joint statistical agreement with the NORC. Bureau staff selected the sample of blocks and contributed the basic questionnaire design. NORC researchers helped refine the questionnaire, drew the sample within blocks, conducted the interviews, managed all other aspects of field work, prepared data files, and collaborated with Bureau employees on data analysis.

OES and SCP research methods and preliminary interpretations of census nonresponse were first presented at the Bureau's 1991 Annual Research Conference.<sup>13</sup> The major findings concerning the promotional and outreach program were that—

- Outreach and publicity appeared to improve response and seemed as successful or more successful in 1990 than in 1980. However, the OES revealed that outreach was less successful among Blacks than among non-Hispanic Whites or Hispanics.
- One of the best predictors of response was the respondent's general awareness of the census or prior knowledge that a census form would be arriving soon. The OES found that public awareness of the census (indicated by those who had recently heard about it from any

source) increased from 57 percent in late January and early February 1990 to 91 percent by April/May 1990.

- Age also had a significant impact on response, with younger people being less likely than older ones to complete and return the forms. This suggested that future outreach efforts should consider targeting younger people.
- One of the most important components of nonresponse was nonreceipt of census forms, a problem that seemed to have increased since 1980.

The Census Bureau also concluded a number of joint statistical agreements with several researchers to conduct focus groups with census mail respondents and nonrespondents to discuss possible causes for the low response. Some of the main themes that emerged from these focus group meetings tended to reinforce the findings of the SCP (the positive influence of awareness and knowledge about the census and the negative effects of a lack of trust in government and nontraditional household composition) while others raised issues that will require further study (e.g., the question of census eligibility and the complexity of census forms).<sup>14</sup>

Other research involving the 1990 census promotional and outreach program addressed such issues as change in census awareness over time; the effects of knowledge about the census; attitudes toward government, privacy, and confidentiality; exposure to advertisements; and handling and appearance of the mail package and census form. (See ch. 11.)

**Telephone Survey**—Respondent cooperation—getting the public to complete and return their preaddressed and geographically encoded census questionnaires—was one key objective of the 1990 census.

Census planners anticipated a 70-percent mail response rate<sup>15</sup> for the approximately 99.1 million questionnaire packages sent through the mail or delivered by census enumerators. A lower-than-expected mail response rate appreciably increased the cost of the field operations necessary to enumerate households not returning their questionnaires, and it raised questions about the methodology to be used for future censuses.

The Statistical Support Division (STSD) conducted the Telephone Survey of Census Participation (TSCP) in June 1990 to contribute to an understanding of the lower-than-expected mail response rate, explore issues of address

<sup>14</sup>For more information, see *ibid.*, pp. 20-21 and the focus group reports, Don A. Dillman and Robert W. Reynolds, "Reasons for not Responding by Mail to the 1990 Census: Hypotheses for Research," (unpublished), n.d.; Lonnie E. Mitchell, "Bureau of Census Focus Group Facilitation," (unpublished), August 1990; and Robert B. Cialdini, "Interim Report, Research on Census and Survey Participation" (unpublished), n.d. [1991].

<sup>15</sup>The mail response rate was calculated by dividing the number of questionnaires returned by mail by the total number of questionnaires mailed to potential respondents. The denominator included vacant and nonexistent as well as occupied housing units.

<sup>13</sup>See Robert Fay, Nancy Bates, and Jeffrey Moore, "Lower Mail Response in the 1990 Census: A Preliminary Interpretation," in Bureau of the Census, 1991 Annual Research Conference, *Proceedings* (Washington, DC: Government Printing Office, 1991), pp. 3-32.

preparation and questionnaire delivery, and gather respondent reaction to the receipt of the census form. The TSCP was administered from the Field Division's Hagerstown, MD, computer-assisted telephone interviewing (CATI) facility. Only households in Cleveland, OH, and New York City, NY, were contacted. Cleveland and New York City were selected for this survey because both were urban areas which had a low mail response rate. Such rates in large cities were generally lower than elsewhere in the Nation. At the time this survey was planned, the national mail response rate was well below the anticipated 70 percent, and in Cleveland and New York City, the rates were 51.4 and 53.2 percent, respectively. The intent of the TSCP was not to compare responses between Cleveland and New York, but to evaluate the extent of and reasons for census participation/nonparticipation in two major cities.

**Survey Methodology**—Random digit dialing (RDD) was used to accomplish the TSCP in a timely manner. Timeliness was important because the further off Census Day was, the more recall bias there was likely to be. Due to competing surveys and the decennial census, Field Division did not have enough field representatives available for a personal-visit survey. Cost and personnel considerations dictated a telephone survey. Computerized census files and filmed questionnaires did not contain household telephone numbers, so RDD was selected as the preferred method. Based on sampling methodology developed by a former Bureau official,<sup>16</sup> a current American Telephone and Telegraph Company tape of telephone exchanges was used to select a systematic sample of 1,532 exchanges (666 in Cleveland and 866 in New York) from 40,524 exchanges. These exchanges comprised 6 digits (the area code plus the first 3 digits); numbers were generated randomly to complete the 10-digit calling number, and were initially called to determine if they were residential. Telephone banks (groups of 100 numbers that shared the first 8 digits) were based on this initial screening. If the number called was residential, the whole bank of 100 numbers served as a primary sampling unit. There were 197 telephone banks formed for Cleveland and 502 for New York. Six telephone numbers from each 100 number bank were randomly selected as the initial sample. Five randomly selected replacement numbers were designated for each initial sample number and were used when the initial number was nonresidential or could not be reached for some other reason.

**Findings**—From this survey, the Bureau hoped to learn first-hand, from the respondents themselves, about their experience with the 1990 census. Even though interviewers spoke with the person who usually opened the mail for the sample address, the responses indicated that he/she was not always able to accurately report receipt of the census questionnaire. Respondents in multiunit buildings

with two to four apartments reported receipt of a census form at a statistically significantly lower rate than any type of unit. A surprising number of persons reporting receiving multiple forms. This was something STSD had no way of verifying. Some respondents said they understood that completed census forms had to be mailed to the appropriate census office on or before April 1 and that questionnaires returned after April 1 would not be accepted.

The Bureau was interested in the respondents' reaction to the census questionnaire. The data STSD gathered indicated that many respondents apparently perceived the short form as a long form. The census records indicated that when respondents reported not being visited by a census enumerator, quite often they were. Respondents indicated that they returned their questionnaires from a sense of patriotic duty, a commitment to their community, and also because it was the law. Those who did not return the form said it was mainly because of time pressures: "too busy," "forgot," or "form got lost before it could be returned."<sup>17</sup>

### **National Services Program (NSP) Structured Debriefings Study**

NSP was a Bureau program concerned with census outreach and data dissemination and marketing through national minority (and other) service organizations. NSP helped these national organizations implement outreach activities in support of the census.

The NSP Structured Debriefings Study examined the NSP outreach program through structured interviews with 17 national organizations' leaders. The Bureau's Center for Survey Methods Research (CSMR), in collaboration with NSP staff, set the scale of the NSP evaluation and designed the basic approach to the program—debriefing interviews with leaders of NSP-targeted organizations—over the winter and spring of 1990. In early summer, CSMR called together a committee, including DUSD and FLD representatives, which developed the debriefings program in detail.

While the study was not designed to definitively evaluate the effectiveness of the NSP, an analysis of the interview results identified some collective conclusions. These were—

- National organizations strongly supported the NSP outreach effort.
- The long-term effects of national-organization and NSP relationships were positive. These effects include increased community goodwill, improved relationships with minority leaders, a more positive image of the census and the Bureau, and better informed people.<sup>18</sup>

<sup>17</sup>See "Preliminary Results for the Telephone Survey of Census Participation," 1990 Decennial Census Preliminary Research and Evaluation Memorandum (PREM) #31 and "Final Results from the Telephone Survey for Census Participation," 1990 Decennial Census PREM #90.

<sup>18</sup>For final results and the discussion guide, see 1990 Decennial Census PREM #102, January 10, 1992, "National Services Program Structured Debriefing: Summary of Results."

<sup>16</sup>Waksberg, Joseph. "Sampling Methods for Random Digit Dialing." *Journal of the American Statistical Association*. Vol. 73, No. 361 (March 1978), pp. 40-46.

## **Census Education Project Evaluation**

The purpose of the Census Education Project (CEP) was to make school administrators and teachers aware of the 1990 census and through classroom and homework assignments expose the students and their families to it as well. (See p. 39 for description.) To evaluate whether the project achieved this aim, CSMR staff telephoned a sample of principals and superintendents of schools, oversampling those in high-interest areas. They asked whether the school received the education package and whether it was distributed. Administrators answering yes to both questions were asked for lists of teachers to whom questionnaires were distributed for assessment of classroom use of CEP materials. Two major problems severely limited analysis of CEP evaluation data: an extremely low response rate to the questionnaire mailed to teachers and the failure to develop a weighting scheme to fully account for the complexities of the initial sample of school administrators. Nevertheless, preliminary unweighted results clearly suggested that the distribution system for CEP materials was

especially failure-prone for "general population" schools; for schools with high enrollment of minority students, however, distribution of the curriculum materials (generally hand-delivered by CAPP staff) appeared to be much more successful and complete.

## **1990 Census Logo**

Initially, three designs of the Census '90 logo (see p. 12) were submitted to the CPO. The Ad Council tested the favored design under the direction of Ogilvy & Mather, the volunteer advertising firm, and compared it with one other potential design. The evaluation method consisted of "intercept" interviews at shopping malls with 400 respondents in 10 geographically dispersed metropolitan areas. Respondents were chosen according to their race, ethnicity, and income. Overall, the test results indicated a positive acceptance of the selected logo. The Advertising Council recommended that the Bureau use it for the 1990 census and in the future.

# APPENDIX 5A.

## Selected Census Bureau Internal Documentation Pertaining to Decennial Census Outreach and Promotion

### 1985 TEST CENSUSES

#### Decision Memorandums

- 5. June 1984 "Role of the State Data Centers in the 1985 Pretest"
- 9. July 1984 "Telephone Assistance Number and Questionnaire Assistance Center"

#### General Information Memorandums

- 8. November 1984 "Local Review Program for the 1985 Census of Tampa, Florida, and Jersey City, New Jersey"
- 13. February 1985 "1985 Pretest Questionnaire Instruction Guides"
- 16. April 1985 "1985 Test Census, Status of Outreach and Promotion for the 1985 Test Census"
- 17. April 1985 "1985 Test Census Spanish Questionnaires and Guides"

### 1986 TEST CENSUS

#### Information Memorandums

- 15. March 1986 "Community Awareness Program—General Population Survey Questionnaire"
- 16. April 1986 "Privacy Act Notice for Census Community Awareness Program"
- 19. April 1986 "Census Community Awareness Program—Survey of Leaders of Community Organizations"

#### Preliminary Research and Evaluation Memorandums

- 9. May 1986 "1986 Census Community Awareness Program (CCAP) General Population Survey—Select Primary Findings"
- 18. June 1986 "Outreach Focus Group Reports from the 1986 Test Census of Central Los Angeles County, California"
- 32. October 1986 "Effects of Mail Reminder Cards on Return Rates in the 1986 Census of Central Los Angeles City"
- 48. March 1987 "Executive Summary of the Report: The Census Community Awareness Program and Evaluation of the Potential and Actual Effectiveness of CCAP Based on Evidence"
- 50. April 1987 "1986 Test Census—Telephone Assistance Operation"

### 1987 TEST CENSUSES

#### Information Memorandums

- 3. June 1986 "Review Procedures for 1987 Test Census Outreach Materials"
- 19. March 1987 "Outreach Program"

### 1988 DRESS REHEARSAL

- 32. January 1988 "Community Action Guide for the 1988 Dress Rehearsal"

### 1990 CENSUS

#### Data Products Planning Memorandums

- 19. June 1989 "1990 Census Data Products Planning: Data Product Information and Promotion Program"

## Decision Memorandums

2. November 1984 "Decision to Conduct a Public Service Advertising Campaign for the 1990 Census"
44. December 1987 "1990 Decennial Census Shelter/Street Night (S-Night) Enumeration"
47. April 1988 "Scope of the 1990 Tribal Liaison Program"
68. July 1989 "Languages for the Asian 800 Telephone Questionnaire Telephone Assistance (TQA) Numbers"

## Information Memorandums

13. September 1983 "Interim Recommendations from 1990 Census Planning Committee for Outreach"
18. December 1983 "1990 Outreach Planning Committee Final Report"
58. January 1985 "Program Plan for Outreach"

## Local Review Memorandums

3. February 1987 "Conducting the 1990 Local Review"

## Outreach Memorandums

1. September 1985 "Establishment of Outreach Memoranda Series"
2. October 1985 "Advance Conference Reports"
3. January 1986 "Meeting Notes from the 1986 Outreach Committee"
4. March 1986 "Notes from the January 1986 Outreach Committee Meetings"
5. March 1986 "1986 Test Census Outreach Plan"
6. March 1986 "Status Report of the 1986 Census Test Outreach Program"
7. March 1986 "Notes from the February 1986 Outreach Committee Meeting"
8. April 1986 "Report of the 1986 Los Angeles Community Meeting with the Asian American Community — February 12, 1986"
9. April 1986 "Status Report of the 1986 Census Test Outreach Program"
10. May 1986 "Status Report of the 1986 Census Test Outreach Program"
11. June 1986 "Notes from the March 1986 Outreach Committee Meeting"
12. June 1986 "Report of the Regional Meeting on the 1990 Census with the Southeast American Indian Communities and the Census Bureau held in Nashville, Tennessee on February 20, 1986"
13. June 1986 "Status Report of the 1986 Test Census Outreach Program"
14. July 1986 "Report of the 1987 Site Selection Consultation Conference held in Arlington, Virginia on August 26-27, 1985"
15. August 1986 "Status Report of the 1986 Test Census Outreach Program"
16. September 1986 "Regional Meeting with the Southern California American Indian Communities and the Census Bureau held in Sacramento, California on December 3, 1985"
17. September 1986 "Regional Meeting with the Southern California American Indian Communities and the Census Bureau held in San Diego, California on December 5, 1985"
18. September 1986 "Status Report of the 1986 Test Census Outreach Program"
19. October 1986 "Meeting of Census Bureau Staff with Members of the Asian American Community, April 3, 1986 in San Francisco, California"
20. October 1986 "Report of the Regional Meeting on the 1990 Census with the Northeast American Indian Communities and the Census Bureau held in Boston, Massachusetts on May 29, 1986"
21. May 1987 "Report of the Regional Meeting on the 1990 Census with the Northern Plains American Indian Communities and the Census Bureau held in Bismarck, North Dakota on August 7, 1986"
22. May 1987 "Meeting of Census Bureau Staff with Representatives of the Detroit Community"
23. June 1987 "Meeting of Census Bureau Staff with Representatives of the Oakland Community"
24. July 1987 "Meeting of Census Bureau Staff with Representatives of the Hartford Community"



25. September 1987 "Meeting of Census Bureau Staff with Representatives of the Los Angeles Community"
26. September 1987 "Report of the Regional Meeting on the 1990 Census with the Great Lakes American Indian Communities and the Census Bureau held in Minneapolis, Minnesota on August 5, 1986"
27. September 1987 "Meeting of Census Bureau Staff with Representatives of the Philadelphia Community"
28. November 1987 "Meeting of Census Bureau Staff with Representatives of the Atlanta Community"
29. December 1987 "Meeting of Census Bureau Staff with Representatives of the New Orleans Community"
30. December 1987 "1990 Census Education Project Components, Distribution, and Promotion Plan"
31. February 1988 "Mail Reminder Card"
34. December 1988 "1990 Endorsements"
35. January 1989 "National Head Start Initiative Memorandum of Understanding"

#### **Planning Memorandums**

13. February 1984 "Local Public Meetings (LPM's)"

#### **Policy Memorandums**

7. March 1987 "1990 Census Outreach Activities: Acknowledgments for Persons Participating in Census Programs"

#### **Preliminary Research and Evaluation Memorandums**

97. October 1991 "Reaching Everyone: Encouraging Participation in the 1990 Census"
102. January 1992 "National Services Program Structured Debriefing: Summary of Results"

#### **Miscellaneous Memorandums**

- 1990 Census Regional Office Memorandums/1990 Decennial Census DPLD to CAO Memorandum No. 89-07, June 15, 1989
- 1990 Decennial Census Outreach Plan, September 1983 and January 1986
- 1990 Census Promotion Program Overview, DPLD
- Shenk, J. Frederick. Census Promotional Report. (unpublished) October 1992

## APPENDIX 5B. Selected Promotional Materials

Table 1. **Product Descriptions, Number Ordered, and Distribution Dates of Selected Promotional Materials**

| Product number   | Title or description   | Distribution |          |
|------------------|--|--------------|----------|
|                  |  | Quantity     | Date     |
| <b>Brochures</b> |  |              |          |
| D-3225           | Broadcasters and the 1990 Census   | 50,000       | 08/24/89 |
| D-3233           | Census Logo  | 125,000      | 07/27/89 |
| D-3201A(Enc)     | Encuentro Informational [comic book]   | 263,000      | 03/05/90 |
| D-3235           | Local Review and You: A Two-Way Street   | 93,000       | 11/02/89 |
| D-3214(I/AK)     | Motivational (AIAN)  | 1,438,000    | 02/26/90 |
| D-3214(AS)       | Motivational (American Samoa)  | 40,000       | 02/26/90 |
| D-3214 (API)     | Motivational (API)   | 1,286,000    | 03/02/90 |
| D-3214(B)        | Why You, As A Black American, Should Answer the Census? (motivational)         | 2,700,000    | 02/08/90 |
| D-3214(CNMI)(E)  | Motivational (Central North Marianas) English                                  | 15,000       | 03/14/90 |
| D-3214(Chinese)  | Motivational (Chinese)   | 1,275,000    | 03/05/90 |
| D-3214G          | Motivational (Guam)  | 6,500        | 03/21/90 |
| D-3214(Korean)   | Motivational (Korean)  | 1,252,000    | 02/26/90 |
| D-3214P          | Motivational (Palau)   | 15,000       | 03/26/90 |
| D-3214(Samoa)    | Motivational (Samoan-Stateside)  | 15,673       | 03/26/90 |
| D-3214           | Motivational (Spanish-English)   | 1,773,500    | 03/07/90 |
| D-3214(VI)       | Motivational (Virgin Islands)  | 1,972,000    | 02/26/90 |
| D-3240(I/AK)     | Working Together for a Complete Count (museum)                                 | 260,000      | 05/07/90 |
| D-3215A          | Make Yourself Count (point of purchase)  | 30,000,000   | 02/20/90 |
| D-3207           | Your Heritage Counts in Census '90 (race question)                             | 702,000      | 03/14/90 |
| D-3207(I/AK)     | American Indians and Alaska Natives—The Census Counts for You! (race question) | 275,000      | 02/28/90 |
| D-3207(API)      | Asians and Pacific Islanders—You Count in Census '90 (race question)           | 701,000      | 02/16/90 |
| D-3207(B)        | Race question (Black)  | 702,000      | 02/16/90 |
| D-3207(Camb)     | Race question (Cambodian)  | 90,000       | 03/14/90 |
| D-3207(Chinese)  | Race question (Chinese)  | 120,000      | 03/14/90 |
| D-3207(Korean)   | Race question (Korean)   | 90,000       | 03/21/90 |
| D-3207(Laotian)  | Race question (Laotian)  | 90,000       | 03/20/90 |
| D-3207(S)        | Your Hispanic Origin Counts in Census '90 (race question)                      | 971,000      | 02/26/90 |
| D-3207(Viet)     | Race question (Vietnamese)   | 120,000      | 03/14/90 |
| D-3211           | The Best Temporary Job in America ... (recruiting brochure and postcard)       | 10,600,000   | 10/04/89 |
| D-3211(Chinese)  | Recruiting brochure and postcard (Chinese)                                     | 186,000      | 02/16/90 |
| D-3211(Korean)   | Recruiting brochure and postcard (Korean)                                      | 128,000      | 02/16/90 |
| D-3211(S)        | Recruiting brochure and postcard (Spanish)                                     | 2,020,000    | 01/10/90 |

Table 1. **Product Descriptions, Number Ordered, and Distribution Dates of Selected Promotional Materials—Con.**

| Product number  | Title or description   | Quantity  | Distribution |
|-----------------|--|-----------|--------------|
|                 |  |           | Date         |
| D-3211(Viet)    | Recruiting brochure and postcard (Vietnamese)                        | 145,000   | 02/16/90     |
| D-3236          | Response card (business reply postcard)                              | 8,000     | 01/18/90     |
| D-3206          | Your Intro to the 1990 Census  | 4,000,000 | 05/26/89     |
| <b>Mementos</b> |  |           |              |
| N/A             | Baseball caps  | 18,181    | 02/28/90     |
| N/A             | Baseball caps (outlying areas and Puerto Rico versions)              | 2,100     | 03/09/90     |
| D-3202          | Bumper sticker (Answer the Census)                                   | 1,260,000 | 02/21/90     |
| D-32020A        | Bumper sticker (outlying areas and Puerto Rico versions)             | 22,500    | 03/09/90     |
| D-3202(E)(PR)   |  |           |              |
| N/A             | Answer the Census (button)   | 1,300,000 | 02/23/90     |
| N/A             | Button (API version)   | 18,000    | 01/18/90     |
| N/A             | Censo '90 (button)   | 40,000    | 11/21/89     |
| N/A             | Everyone Counts (button)   | 73,000    | 01/26/90     |
| N/A             | Everyone Counts (OA) (button)  | 49,000    | 03/09/90     |
| N/A             | Listen to the Drum (button)  | 300,000   | 08/11/89     |
| N/A             | Miss America (button)  | 500       | 03/21/90     |
| N/A             | Coffee mug (Answer the Census)                                       | 8,160     | 02/28/90     |
| N/A             | Coffee mug (outlying areas version)                                  | 1,100     | 03/15/90     |
| N/A             | Key chain (Answer the Census)  | 1,273,000 | 02/09/90     |
| N/A             | Key chain (outlying areas version)                                   | 2,200     | 03/09/90     |
| N/A             | Magnets (including Puerto Rico version)                              | 32,000    | 03/27/90     |
| N/A             | Pencil "Answer the Census"   | 1,351,000 | 02/09/90     |
| N/A             | Pencil "Answer the Census" (outlying areas and Puerto Rico versions) | 47,000    | 03/09/90     |
| N/A             | Shopping bag (including Puerto Rico version)                         | 1,300,000 | 02/07/90     |
| N/A             | T-shirt—envelope   | 15,290    | 02/15/90     |
| N/A             | T-shirt—logo (including Puerto Rico version)                         | 5,500     | 03/09/90     |
| <b>Flyers</b>   |  |           |              |
| D-3224.8        | Census Facts*  | 1,000,000 | 05/19/89     |
| D-3224.5        | Education project factsheet  | 1,000,000 | 05/16/89     |
| D-3201J(Enc)    | Encuentro Factsheet (religious "talking points")                     | 58,000    | 03/02/90     |
| D-3216D(I/AK)   | For Our Future Flyer   | 114,000   | cancelled    |
| D-3224.2        | How Census Information Is Used*                                      | 1,000,000 | 05/19/89     |
| D-3228          | It's Just Between Us ...   | 1,150,000 | 05/01/89     |
| D-3228(Viet.)   | It's Just Between Us ... (Vietnamese)                                | 200,000   | 10/03/89     |
| D-3228(Chinese) | It's Just Between Us ... (Chinese)                                   | 250,000   | 08/25/89     |
| D-3228(Korean)  | It's Just Between Us ... (Korean)                                    | 200,000   | 08/25/89     |
| D-3228(S)       | It's Just Between Us ... (Spanish)                                   | 750,000   | 08/29/89     |
| D-3230          | Just Arrived in the U.S.?  | 8,426,000 | 02/14/90     |
| D-3230(Chinese) | Just Arrived in the U.S.? (Chinese)                                  | 1,302,000 | 02/09/90     |
| D-3230(Korean)  | Just Arrived in the U.S.? (Korean)                                   | 1,252,000 | 02/09/90     |
| D-3230(S)       | Just Arrived in the U.S.? (Spanish)                                  | 2,000,000 | 02/15/90     |
| D-3230(Viet)    | Just Arrived in the U.S.? (Vietnamese)                               | 1,227,000 | 02/08/90     |
| D-3216B(I)      | Let Our Voices Be Heard (AIAN)                                       | 228,000   | cancelled    |

**Table 1. Product Descriptions, Number Ordered, and Distribution Dates of Selected Promotional Materials—Con.**

| Product number   | Title or description                                      | Quantity  | Distribution |
|------------------|---|-----------|--------------|
|                  |   |           | Date         |
| D-3216A(I)       | Listen to the Drum (AIAN)                                 | 289,000   | cancelled    |
| D-3224.6         | Local Governments Are Vital to a Successful Count         | 1,000,000 | 05/15/89     |
| D-3232           | Need Help With the Census Form?                           | 8,454,000 | 02/14/90     |
| D-3232(Chinese)  | Need Help With the Census Form? (Chinese)                 | 1,302,000 | 02/09/90     |
| D-3232(Korean)   | Need Help With the Census Form? (Korean)                  | 1,252,000 | 02/09/90     |
| D-3232(S)        | Need Help With the Census Form? (Spanish)                 | 2,000,000 | 02/09/90     |
| D-3232(Viet)     | Need Help With the Census Form? (Vietnamese)              | 1,227,000 | 02/09/90     |
| D-3224.4         | Size and Scope*   | 1,000,000 | 05/17/89     |
| D-3227           | Stand Up and Be Counted                                   | 1,150,000 | 05/01/89     |
| D-3227(Chinese)  | Stand Up and Be Counted (Chinese)                         | 250,000   | 08/25/89     |
| D-3227(Korean)   | Stand Up and Be Counted (Korean)                          | 200,000   | 08/25/89     |
| D-3227(S)        | Stand Up and Be Counted (Spanish)                         | 750,000   | 08/11/89     |
| D-3227(Viet)     | Stand Up and Be Counted (Vietnamese)                      | 200,000   | 10/02/89     |
| D-3224.3         | The Census is Strictly Confidential*                      | 1,000,000 | 05/16/89     |
| D-3216C(I)       | We Are All Brothers & Sisters (AIAN)                      | 219,000   | cancelled    |
| D-3216E(I)       | We Are All Children of Mother Earth (AIAN)                | 219,000   | cancelled    |
| N/A              | What Congress Can Do To Help*                             | 1,000     | 03/31/89     |
| D-3224.7         | Why Census Information Is Vital to Communities*           | 1,000,000 | 05/17/89     |
| D-3212A          | You'll Earn More Than Money ...                           | 1,010,000 | 08/04/89     |
| D-3212A(Chinese) | You'll Earn More Than Money ... (Chinese)                 | 70,000    | 02/09/90     |
| D-3212A(Korean)  | You'll Earn More Than Money ... (Korean)                  | 50,000    | 02/09/90     |
| D-3212A(S)       | You'll Earn More Than Money ... (Spanish)                 | 260,000   | 12/20/89     |
| D-3212A(Viet)    | You'll Earn More Than Money ... (Vietnamese)              | 55,000    | 02/09/90     |
| D-3229           | Your Answers Can Help Build a Better Community            | 1,150,000 | 05/01/89     |
| D-3229(Chinese)  | Your Answers Can Help ... (Chinese)                       | 250,000   | 08/25/89     |
| D-3229(Korean)   | Your Answers Can Help ... (Korean)                        | 200,000   | 08/25/89     |
| D-3229(S)        | Your Answers Can Help ... (Spanish)                       | 750,000   | 08/16/89     |
| D-3229(Viet)     | Your Answers Can Help ... (Vietnamese)                    | 200,000   | 10/02/89     |
| D-3224.1         | Your Help Is Needed                                       | 1,000,000 | 05/16/89     |
| D-3224.9         | Your Introduction to the 1990 Census (factsheet)          | 1,000,000 | 05/19/89     |
| <b>Other</b>     |   |           |              |
| D-3203           | The Census Takers Are Coming (Census '90 ads)             | 4,500     | 04/10/90     |
| D-3203(Chinese)  | The Census Takers Are Coming (Chinese, Census '90 ads)    | 3,250     | 04/10/90     |
| D-3203(Korean)   | The Census Takers Are Coming (Korean, Census '90 ads)     | 3,250     | 04/10/90     |
| D-3203(S)        | The Census Takers Are Coming (Spanish, Census '90 ads)    | 5,500     | 04/10/90     |
| D-3203(Viet)     | The Census Takers Are Coming (Vietnamese, Census '90 ads) | 3,250     | 04/10/90     |
| D-3217           | Certificate of Appreciation                               | 500,000   | 04/05/90     |
| D-3221           | Certificate of Appreciation (media)                       | 1,500     | 08/24/90     |
| D-3210           | Communicators kit   | 647,260   | 01/22/90     |
| D-3210A          | Communicators kit (language version)                      | 100,642   | 03/09/90     |
| N/A              | Congressional folder                                      | 1,000     | 03/27/89     |
| D-3201G(Enc)     | Encuentro repro art packet                                | 32,000    | 03/01/90     |

Table 1. **Product Descriptions, Number Ordered, and Distribution Dates of Selected Promotional Materials—Con.**

| Product number  | Title or description   | Quantity  | Distribution |
|-----------------|--|-----------|--------------|
|                 |  |           | Date         |
| N/A             | Information folder   | 763,000   | 05/01/89     |
| D-3237          | Phoenix Plan: 151 Ways to Promote the Census                                       | 20,000    | 01/23/90     |
| D-3215          | Point-of-purchase box  | 150,000   | 02/20/89     |
| D-3209          | Public Service Announcement (local product package)                                | 20,000    | 02/23/90     |
| D-3208          | What Your Congregation Should Know About the Census (religious talking points)     | 440,000   | 02/21/90     |
| <b>Posters</b>  |  |           |              |
| D-3220          | "Answer Your Census" (action poster)   | 1,900,000 | 03/05/90     |
| D-3220(API)     | "America Is Counting on Us" (API, action poster)                                   | 500,000   | 02/26/90     |
| D-3220(B)       | "Here Comes the 1990 Census" (Black, action poster)                                | 746,000   | 02/28/90     |
| D-3223D(I/AK)   | "For Our Future" (AIAN-Alaska, awareness poster)                                   | 183,890   | 01/04/90     |
| D-3223A(I/AK)   | "Listen to the Drum" (AIAN-National, awareness poster)                             | 95,250    | 01/04/90     |
| D-3223C(I/AK)   | "We Are All Children of Mother Earth" (AIAN-rural, awareness poster)               | 71,950    | 03/17/90     |
| D-3223B(I/AK)   | "We Are All Brothers and Sisters" (AIAN-urban, awareness poster)                   | 71,950    | 02/09/90     |
| D-3223(API)     | "Lets Reach for Our Future" (API, awareness poster)                                | 201,140   | 01/03/90     |
| D-3224(B)       | "Lift Every Voice" (Black, awareness poster)                                       | 764,170   | 01/03/90     |
| D-3223(S)       | "Censo 1990" (Spanish, awareness poster)   | 560,670   | 01/04/90     |
| D-3223          | "Toolbox" (awareness poster)   | 625,000   | 01/02/90     |
| D-3201E(Enc)    | "Unidos Contamos"—"Together We Count" (Encuentro)                                  | 130,000   | 03/05/90     |
| D-3220(S)       | "This Is Our Chance" (Hispanic, action poster)                                     | 425,000   | 03/05/90     |
| D-3205(I)       | "Let Our Voices Be Heard" (AIAN)   | 50,000    | 04/17/89     |
| D-38            | "Move Boldly. Get Off Your Fantail" (maritime)                                     | 2,200     | 09/13/89     |
| D-39            | "It's Your Duty" (military)  | 50,000    | 10/13/89     |
| D-3239          | "Open Your Door to a Better Future" (outlying areas, action poster)                | 20,000    | 02/20/90     |
| D-3239(VI)      | "Open Your Door to a Better Future" (outlying areas—Virgin Islands, action poster) | 10,000    | 02/20/90     |
| D-3212(Chinese) | Recruiting (Chinese)   | 65,000    | 02/09/90     |
| D-3212(Korean)  | Recruiting (Korean)  | 44,000    | 02/09/90     |
| D-3212          | Recruitment  | 1,160,000 | 09/01/89     |
| D-3212(S)       | You'll Earn More Than Money ... (Spanish)  | 253,000   | 12/15/89     |
| D-3212(Viet)    | You'll Earn More Than Money ... (Vietnamese)                                       | 51,000    | 02/09/90     |

\*Included in 1,000 congressional kits, distributed 03/31/89. N/A Not applicable.

Table 2. **Audio-Visual Tapes**

| Audio-visual tapes  | Time  | Distribution date |
|---|-------|-------------------|
| AIAN Outreach (loop)  | 60:00 | 03/13/90          |
| AIAN (Minority Advisory Committee (MAC)) Public Service Announcement (PSA) reel | 8:25  | 02/15/90          |
| Alaska/Miss Indian America PSA  | 1:30  | 02/15/90          |
| Animated tags (1)   | 10:00 | 09/25/89          |
| Asian/Pacific Islander reel   | 25:30 | 03/15/90          |
| B-roll assembly   | 18:15 | 01/11/90          |
| Be Counted Alaska (PSA)   | 1:00  | (NA)              |
| Black Audience Campaign reel  | 20:00 | 03/09/90          |
| Briefing (with C. Jones)  | 9:26  | 02/10/89          |
| Briefing (long version)   | 12:25 | 02/03/89          |
| Briefing (Phoenix)  | 7:32  | 03/22/89          |
| Briefing (voice over version)   | 8:55  | 02/10/89          |
| Celia Cruz PSA & feature  | 8:00  | 12/00/89          |
| Censo '90 (Hispanic)  | 12:05 | (NA)              |
| Censo '90 (Hispanic)  | 26:00 | 02/15/90          |
| Census '90 Open   | 00:10 | 01/19/89          |
| Census and You (Flores Segment)   | 2:30  | 02/11/90          |
| Census and You (Hispanic)   | 12:30 | 02/15/90          |
| Census Takers Are Coming  | 20:00 | 04/10/90          |
| Census '90, Briefly   | 05:40 | 05/31/90          |
| Census '90 Sampler  | 15:30 | 03/09/90          |
| Compilation reel  | 11:30 | 01/15/90          |
| Complete Count (National League of Cities version)                              | 13:00 | 11/00/89          |
| Complete Count (stand alone)  | 13:00 | 11/00/89          |
| Complete Count (version B)  | 13:00 | 11/00/89          |
| Dr. Bryant's swearing-in  | 28:30 | 08/16/90          |
| Ebony/Jet Showcase PSA's  | 3:00  | 01/10/90          |
| File footage  | 19:00 | 10/04/88          |
| For the 90's & Beyond   | 8:15  | 08/00/90          |
| Hispanic Background footage   | 45:30 | 02/00/90          |
| Hispanic Outreach   | 20:00 | 05/01/90          |
| IAIA Celebration  | 21:43 | 05/00/90          |
| IAIA Outreach reel  | 20:00 | 03/07/90          |
| Interview   | 8:25  | 10/00/90          |
| It Counts For All of Us (API)   | 13:03 | 02/16/90          |
| Joe's Advisory  | 10:30 | 04/21/88          |
| Kickoff at the Apollo   | 8:05  | 03/00/90          |
| Lift Every Voice  | 15:00 | 02/22/90          |
| Listen to the Drum  | 14:15 | 02/21/90          |
| Logo/Music reel   | 12:00 | 12/07/89          |
| MAC Presentations   | 17:33 | 10/24/89          |
| MAC PSA's (1st batch)   | 30:00 | 01/11/90          |
| MAC PSA's (2nd batch)   | 30:00 | 01/11/90          |
| Mayors (Group 1) PSA's  | 30:00 | 01/11/90          |
| Mayors (Group 2) PSA's  | 30:00 | 01/11/90          |
| Mayors Sample PSA reel  | 3:08  | 11/07/89          |
| Melba Moore (NY RCC) PSA  | 1:00  | 03/09/90          |
| Miss America PSA's  | 1:00  | 01/10/90          |
| Miss Indian America   | 00:30 | 02/15/90          |
| Music/EFX audio reels   |       |                   |

Table 2. **Audio-Visual Tapes**—Con.

| Audio-visual tapes   | Time  | Distribution date |
|--|-------|-------------------|
| Nancy Kwan PSA   | 5:00  | 02/06/90          |
| People reel  | 19:47 | 03/00/90          |
| Post April 1 tags  | 3:00  | 04/10/90          |
| Poster Institute for American Indian Art (IAIA) (drum segment) | 8:00  | 02/23/90          |
| President Bush PSA's   | 1:30  | 02/15/90          |
| Sampler—In reach (loop)  | 30:00 | 03/26/90          |
| Sampler—In reach   | 60:00 | 03/26/90          |
| Slate/backgrounds  | 15:00 | 09/26/89          |
| Slide show with tape (general audience)                        | —     | (NA)              |
| Spanish Loop #1  | 6:00  | 01/09/90          |
| Spanish Loop #2  | 15:11 | 04/14/89          |
| Spanish Loop #3  | 18:09 | 12/21/89          |
| Target Audience reel (AIAN)                                    | 53:00 | 05/00/90          |
| This is the Census (National Association of Broadcasters feed) | 4:30  | 01/08/90          |
| This is the Census (unmixed)                                   | 4:30  | 01/08/90          |
| Time to Stand Up (Black)                                       | 8:47  | 02/21/90          |
| Variety reel   | 17:15 | 02/21/90          |
| Video Promotions Sampler                                       | 22:35 | 03/22/90          |
| What Happens to Your Questinnaire?                             | 6:20  | 05/00/90          |
| You Count PSA  | 20:00 | 02/00/90          |
| 1990 Census Promo Campaign                                     | 21:30 | 05/23/90          |
| 1990 Census Promo Campaign                                     | 11:20 | 09/06/90          |

NA Not available.



**Table 3. Product Type by Intended Audience**

| Product description                             | Audience |
|---|----------|
| <b>Billboards</b>                               |          |
| Schools   | General  |
| Out Of Sight—Out of Mind                        | Black    |
| Participe                                       | Hispanic |
| <b>Collaterals</b>                              |          |
| Bill stuffer, bag art                           | General  |
| Bag art, bumper sticker, button, badge          | Hispanic |
| Poster—Abacus (Eng.) & 4 Asian                  | API      |
| <b>Magazine Ads</b>                             |          |
| Day care, schools-3, jobs-2, clinics-2          | General  |
| Out of Sight—Out of Mind                        | Black    |
| Participe (2)                                   | Hispanic |
| Abacus—Asian (12)                               | API      |
| <b>Newspaper Ads</b>                            |          |
| Clinics (3), school (3), jobs (2)               | General  |
| Out of Sight—Out of Mind                        | Black    |
| Participate (2)                                 | Hispanic |
| Abacus—English (2) & Asian (10)                 | API      |
| <b>Radio Spots (various lengths)</b>            |          |
| General audience (2)                            | General  |
| Black audience (3)                              | Black    |
| Hispanic—English (2) & Spanish (6)              | Hispanic |
| <b>Transit Posters</b>                          |          |
| Schools   | General  |
| Participe (2)                                   | Hispanic |
| Abacus—English & Asian (4)                      | API      |
| <b>TV Spots (each in :15 &amp; :30 lengths)</b> |          |
| Matchsticks                                     | General  |
| Stand Right Up * Do Good (2)                    | Black    |
| Presencia—English & 3 Spanish                   | Hispanic |
| Abacus—English & 4 Asian                        | API      |
| <b>Other</b>                                    |          |
| American Advertising Federation flyer           | General  |
| American League of Financial Institute—ad       | General  |
| “America’s Fact Finder”—new art                 | General  |
| API banner                                      | API      |
| API kickoff (signs, name cards, etc.)           | API      |

Table 3. **Product Type by Intended Audience**—Con.

| Product description                                    | Audience |
|--|----------|
| Apollo kickoff (program & name cards)                  | Black    |
| Apple Worldwide Conference—ad                          | General  |
| Asian Pacific American Chamber of Commerce ad          | API      |
| Business cards   | Census   |
| Cable TV article & fact sheet                          | General  |
| Census cycle chart                                     | General  |
| Census stickers  | General  |
| Census Takers Are Coming scripts/edit.                 | General  |
| Champion Milk Carton ads (2)                           | General  |
| Chino-American Convention flyer                        | API      |
| Communique on Progress 02/89                           | Census   |
| Congressional Affairs masthead                         | Congress |
| Congressional Alert header                             | Congress |
| Congressional Alert—Public Law 101-86                  | Congress |
| Census Promotion Office letterhead                     | Census   |
| Census Promotion Office MIS Progress report            | Census   |
| Darius News Serving Mailings:                          |          |
| New National Census Begins                             | General  |
| 1990 Census Data Is Important ...                      | General  |
| 1990 Census Assistance ...                             | General  |
| Census Takers are Coming                               | General  |
| Temporary Jobs Available                               | General  |
| Confidentiality  | General  |
| What's Your Role ...                                   | General  |
| Deborah Crable video PSA                               | Black    |
| Delta Airlines "napkin" art                            | General  |
| Delta Sigma Theta ads                                  | Black    |
| Directory of Experts, ... ad                           | General  |
| Donnelley Envelope ad                                  | General  |
| Dr. Bryant photo display                               | Census   |
| Enumerator badge                                       | General  |
| FAX cover sheet for Census Promotion Office            | Census   |
| Federal Lao Association of America ad                  | API      |
| Filipino flyer   | API      |
| Generic speech   | General  |
| Giant Food milk carton ad                              | General  |
| Hispanic full page ad                                  | Hispanic |
| Indian poster award placards (2)                       | AIAN     |
| Indian teabags graphics                                | AIAN     |
| Indochina Resource Center news articles (2)            | API      |
| International car wash article                         | General  |
| IRAC job flyer   | API      |
| Kincannon [Deputy Director] missive re Speakers Bureau | Census   |

Table 3. Product Type by Intended Audience—Con.

| Product description                                | Audience    |
|--|-------------|
| Larry Bryant information sheet                     | Black       |
| Logo brochure for employees                        | Census      |
| Logo sheet (pre logo brochure)                     | General     |
| LULAC Conference video footage                     | Hispanic    |
| Magazine ad—general                                | General     |
| Marketing typeset labels                           | Census      |
| Maryland kickoff banner                            | General     |
| Maryland kickoff videotaping                       | General     |
| Media Outreach Summary-Black America               | Black       |
| Military Census Transmittal                        | Military    |
| Minority Advisory Committee name tags              | Census      |
| Miscellaneous camera ready art                     | All         |
| Model release form                                 | General     |
| Montgomery Ward billing insert                     | General     |
| NAACP "Crises" magazine articles (6)               | Black       |
| NAACP Talking Points                               | Black       |
| NAB Convention booklet ad                          | General     |
| NAB PSA scripts                                    | General     |
| Names plates/invitations                           | Census      |
| National Association of Black Pages ad             | Black       |
| National Association of Urban Bankers ad           | Black       |
| National Bankers Association ad                    | General     |
| National Cable Industry                            | General     |
| National School Transportation ad                  | General     |
| National Services Agencies articles (2)            | General     |
| National Urban League ad                           | Black       |
| National 4-H Council ad                            | General     |
| National Congress of Vietnamese in America posters | API         |
| Newsletter logos                                   | General     |
| North Carolina Press Association ad                | General     |
| New York transit posters                           | General     |
| Organization of Chinese Americans                  | API         |
| Pacific Island forum chart                         | API         |
| Participe en el Censo—flyer                        | Hispanic    |
| Philadelphia region banner                         | General     |
| Plankowners certificate                            | Census      |
| Police poster—insert logo                          | General     |
| Professional Asian Women poster                    | API         |
| Puerto Rico banner                                 | Puerto Rico |
| Puerto Rico logo                                   | Puerto Rico |
| Puerto Rico promotion chart                        | Puerto Rico |
| Question and Answer response guide                 | Census      |
| Ridge/Goodling Amendment-flyer                     | General     |

**Table 3. Product Type by Intended Audience—Con.**

| Product description                    | Audience |
|--|----------|
| Special Advisory Committee stationery  | Census   |
| Safeway grocery bag art                | General  |
| Sabado Gigante chart                   | Hispanic |
| Slide show mailing labels              | General  |
| Spanish logo sheets                    | Hispanic |
| Spanish parade handbill                | Hispanic |
| State Cable Television mailing inserts | General  |
| Television Age magazine ad             | General  |
| Treasury check message                 | General  |
| Tribal distribution flowchart          | AIAN     |
| United Way invitation                  | General  |
| United Way newsletter articles (6)     | General  |
| United States News headline logo       | General  |
| Videotape labels                       | Census   |

Note: Census Promotional Office also produced materials distributed at Congressional Town Meetings.  
 Some products cancelled prior to final production (see Census Promotional Office Products Manual).  
 Special presentation covers for 80 organizations promoting census (see app. 5C).

# APPENDIX 5C.

## Selected National Organizations Endorsing the 1990 Census

|  |   |
|--|---|
| African Methodist Episcopal Church                               | Black Congress on Health, Law, and Economics              |
| African Methodist Episcopal Church (Women's Auxiliary)           | Black Family Summit                                       |
| African Methodist Episcopal Church Lay Organization              | Buddhist Churches of America                              |
| African Methodist Episcopal Church, Sixth Episcopal District     | Chinese-American Librarians Association                   |
| Alaska Federation of Natives                                     | Church of God in Christ                                   |
| Alpha Kappa Alpha Sorority, Inc.                                 | Congress of National Black Churches                       |
| Alpha Phi Alpha Fraternity, Inc.                                 | Children's Television Workshop                            |
| American Association of Blacks of Energy                         | Chinese American Citizens Alliance                        |
| American Association of Retired Persons                          | Christian Methodist Episcopal Church                      |
| American Association of School Administrators                    | Christian Methodist Episcopal Church (Women's Auxiliary)  |
| American Association for Adult and Continuing Education          | COMAP, Inc. - Consortium                                  |
| American Association for Affirmative Action                      | COMAP, Inc. - Elementary Math                             |
| American Council on Education                                    | Congressional Black Caucus                                |
| American Economic Association                                    | Congressional Black Caucus Foundation                     |
| American Federation of Teachers                                  | Congressional Education Associates                        |
| American GI Forum  | Council for Tribal Employment                             |
| American Indian Library Association                              | Council for American Private Education                    |
| American Library Association                                     | Council of Chief State School Officers                    |
| American Library Association - Reforma                           | Cuban American National Council                           |
| American Newspaper Publication Association Foundation            | Delta Sigma Theta Sorority, Inc.                          |
| American Public Health Association                               | Federation of Eastern Stars of the World                  |
| Americans for Indian Opportunity                                 | Federation of Masons of the World                         |
| Ancient Egyptian Arabic Order of the Nobles of the Mystic Shrine | Filipino American Political Association                   |
| Asian American Journalists Association                           | Good Apple, Inc.  |
| Asian American Health Forum                                      | Governors' Interstate Indian Council                      |
| Asian American Legal Defense and Education Fund                  | Hispanic National Bar Association                         |
| Asian American Voters Coalition                                  | Hispanic Policy Development Project                       |
| Asian Foundation for Community Development                       | Housing Assistance Council, Inc.                          |
| Asian Pacific American Chamber of Commerce                       | Indochina Resource Action                                 |
| Asian Pacific American Heritage Council, Inc.                    | Improved Benevolent Protective Order of Elks of the World |
| Asian Pacific American Coalition, U.S.A.                         | Indian Health Service                                     |
| Asian/Pacific American Librarians Association                    | Institute for Educational Leadership, Inc.                |
| Asociacion Nacional por Personas Mayores                         | Iota Phi Lambda Sorority, Inc.                            |
| ASPIRA of America, Inc.  | Japanese American Citizens League                         |
| Assault on Illiteracy Program                                    | Joint Center for Political Studies                        |
| Association for Community Based Education                        | Junior Achievement  |
| Association for Supervision and Curriculum Development           | Junior Achievement-National Education Office, Inc.        |
| Association of American Indian Physicians, Inc.                  | Kappa Alpha Psi Fraternity                                |
| Association of Black Sociologists                                | LAO Federation of American                                |
| Association of Hispanic Arts                                     | Labor Council for Latin American Advancement              |
| Association of Mexican American Educators, Inc.                  | Lambda Kappa Mu Sorority, Inc.                            |
| Bible Way Worldwide  | Lawyers Committee for Civil Rights Under Law              |
| Black Caucus of the American Library Association                 | Leadership Conference on Civil Rights                     |
|  | League of United Latin American Citizens                  |
|  | League of Women Voters                                    |

## Selected National Organizations Endorsing the 1990 Census—Continued

MALDEF (Mexican American Legal Defense and Education Fund)  
Mexican American Grocers Association  
Mexican American Women's National Association  
Midwest/Northeast Voter Registration Education Project  
Minority Enterprise Development  
National Associated Farmworker Program  
National Alliance of Black School Educators  
National American Indian Housing Council  
National Asian American Telecommunications Association  
National Asian Pacific American Bar Association  
National Association of the Advancement of Colored People  
National Association Colored Women's Club  
National Association for Asian Pacific American Education  
National Association for Bilingual Education  
National Association for Chicano Studies  
National Association for Education of Cambodian, Laotian, and Vietnamese Americans  
National Association for Equal Opportunity in Higher Education  
National Association for Human Rights Workers  
National Association for Latino Elected Officials  
National Association of Black Engineers  
National Association of Black Journalists  
National Association of Black Social Workers  
National Association of Black Women Entrepreneurs  
National Association of Community Action Agencies  
National Association of Community Health  
National Association of Elementary School Principals  
National Association of Hispanic Journalists  
National Association of Hispanic Nurses, Inc.  
National Association of Hispanic Publications  
National Association of Market Developers, Inc.  
National Association of Media Women  
National Association of Minority Contractors  
National Association of Negro Business and Professional Women's Clubs  
National Association of Professional Asian American Women  
National Association Real Estate Brokers, Inc.  
National Association of Secondary School Principals  
National Association of Social Workers  
National Baptist Convention of America, Inc.  
National Baptist Convention, USA, Inc.  
National Baptist Convention, USA, Inc. Women's Auxiliary  
National Bar Association  
National Black Caucus of Local Elected Officials  
National Black Caucus of State Legislators  
National Black Child Development Institute, Inc.  
National Black MBA Association  
National Black Media Coalition  
National Black Nurses Association, Inc.  
National Business League  
National Catholic Educational Association  
National Caucus and Center for Black Aged  
National Clearinghouse for Bilingual Education  
National Coalition of Black Voter Participation  
National Coalition for an Accurate Count of Asian Pacific Americans  
National Coalition of Hispanic Health and Human Service Organizations  
National Concilio of America  
National Conference of Black Mayors, Inc.  
National Conference of Catholic Bishops, Secretariat for Hispanic Affairs  
National Conference of Puerto Rican Women  
National Congress of American Indians  
National Congress of Parents and Teachers  
National Congress of Vietnamese in America  
National Council for Geographic Education  
National Council for the Social Studies  
National Council of LaRaza  
National Council of Negro Women, Inc.  
National Council of Teachers of Mathematics  
National Council on the Aging  
National Dental Association  
National Economic Association  
National Education Association  
National Endowment for the Art  
National Federation of Asian American United Methodists  
National Federation of Business and Professional Women's Club  
National Federation of Indian American Associations  
National Filipino American Council  
National Forum for Black Public Administrators  
National Geographic Society  
National Head Start Association  
National Hispanic Academy of Media Arts and Sciences  
National Hispanic Council on Aging  
National Hispanic Market Show and Media Expo  
National Image, Inc.  
National Immigrant Refugee/Citizenship Forum  
National Indian Adult Education  
National Indian Council on Aging  
National Indian Education Association  
National Indian Employment and Training Conference  
National Institute for Women of Color  
National Latino Peace Officers Association  
National Medical Association  
National Middle School Association  
National Neighborhood Coalition  
National Network of Asian and Pacific Women

## Selected National Organizations Endorsing the 1990 Census—Continued

|  |   |
|--|---|
| National Newspaper Publishers Association                  | Puerto Rican Legal Defense and Education Fund   |
| National Office of Samoan Affairs                          | SER-Jobs for Progress   |
| National Organization of Black County Officials            | Social Studies/Language Arts Scholastic, Inc.   |
| National Pan-Hellenic Council                              | Sigma Gamma Rho Sorority, Inc.  |
| National Puerto Rican Coalition, Inc.                      | Social Studies Supervisors Association  |
| National Puerto Rican Forum                                | Society of Hispanic Professional Engineers  |
| National Rural Education Association                       | Southern Baptist Home Mission Board   |
| National School Boards Association                         | Southwest Voter Research Institute  |
| National Science Teachers Association                      | Teachers of English to Speakers of other Languages  |
| National Student Business League                           | U.S.-Asia Institute   |
| National Urban Coalition                                   | U.S. Department of Education, Office of Vocational and Adult Education                    |
| National Urban League                                      | U.S. Department of Education, Office of Bilingual Education and Minority Language Affairs |
| Native American Journalists Association                    | U.S. Department of Health and Human Resources, Office of Refugee Resettlement             |
| Neighborhood Housing Services, Inc.                        | U.S. Hispanic Chamber of Commerce   |
| Neighborhood Reinvestment                                  | U.S. Hispanic Women's Chamber of Commerce, Inc.   |
| Opportunities Industrialization Centers (OIC's) of America | U.S. Pan Asian American Chamber of Commerce   |
| Office of Hawaiian Affairs                                 | United Methodist Church   |
| Office of Refugee Resettlement                             | United Methodist Church - Board of Higher Education                                       |
| Omega Psi Phi Fraternity                                   | United Neighborhood Centers of America  |
| Operation PUSH   | <i>Weekly Reader</i>  |
| Organization of Chinese American Women, Inc.               | Zeta Delta Phi Sorority, Inc.   |
| Organization of Pan Asian American Women                   | Zeta Phi Beta Sorority, Inc.  |
| Progressive National Baptist Convention, Inc.              |   |
| Personnel Management Aztlan Management Association         |   |
| Phi Beta Sigma Fraternity, Inc.                            |   |
| Population Reference Bureau                                |   |
| Project Vote   |   |



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# SELECTED ABBREVIATIONS AND ACRONYMS USED IN CENSUS OPERATIONS

|         |  |         |  |
|---------|--|---------|--|
| ABA     | automated budget authorization                   | DOPPERS | decennial operations personnel and payroll system        |
| ACF     | address control file                             | DOT     | Department of Transportation                             |
| ACR     | advance census report                            | DP      | data processing  |
| ADMIN   | administration; administrative                   | DPD     | Data Preparation Division                                |
| ADP     | automatic data processing                        | DPLD    | Decennial Planning Division                              |
| AF      | applicant file                                   | DUSD    | Data User Services Division                              |
| AICS    | automated inventory control system               | EA      | enumerator assignment                                    |
| AL      | advance listing                                  | EAMM    | early alert multilingual mailer                          |
| AM      | area manager                                     | EDF     | edited detail file                                       |
| AMA     | assistant manager for administration             | EDP     | electronic data processing                               |
| AMEDP   | assistant manager for electronic data processing | EEO     | equal employment opportunity                             |
| AMFO    | assistant manager for field operations           | EFQ     | enumerator-friendly questionnaire                        |
| AMOO    | assistant manager for office operations          | EOD     | entrance on duty   |
| ANV     | Alaska Native village                            | FACT    | film and automated camera technology                     |
| APOC    | advance post office check                        | FAX     | facsimile transceiver copier                             |
| AR      | address register                                 | FF      | field followup   |
| ARA     | address register area                            | FLD     | Field Division   |
| ARCM    | assistant regional census manager                | FOS     | field operations supervisor                              |
| ARDC    | assistant regional director for census           | FOSDIC  | film optical sensing device for input to computers       |
| BAS     | boundary and annexation survey                   | FSCPE   | Federal-State Cooperative for Local Population Estimates |
| BG      | block group                                      | FTS     | Federal Telecommunications System                        |
| BOC     | Bureau of the Census                             | GAO     | General Accounting Office                                |
| BDO     | basic district office                            | GBF     | geographic base file                                     |
| BLK     | block  | GEO     | Geography Division                                       |
| BNA     | block numbering area                             | GFT     | guide for training                                       |
| CAPP    | Census Awareness and Products Program            | GPO     | Government Printing Office                               |
| CCAS    | census community awareness specialist            | GQ      | group quarters   |
| CCF     | collection control file                          | GRF     | geographic reference file                                |
| CCS     | collection control system                        | GSA     | General Services Administration                          |
| CD      | congressional district                           | GU      | governmental unit  |
| CE/ HEO | chief executive/ highest elected official        | GUS     | geographic update system                                 |
| CEN     | Census Bureau                                    | HQ      | headquarters (Suitland, MD)                              |
| CL      | crew leader                                      | HTE     | hard-to-enumerate  |
| CLA     | crew leader assistant                            | HU      | housing unit   |
| CLD     | crew leader district                             | HUD     | Department of Housing and Urban Development              |
| COLA    | cost of living adjustment                        | ICR     | individual census report                                 |
| CPS     | cost and progress system                         | ID      | identification   |
| CPU     | central processing unit                          | IG      | Inspector General  |
| CSMR    | Center for Survey Methods Research               | INC     | incorporated place                                       |
| DAPS    | decennial automated payroll system               | IR      | (American) Indian reservation                            |
| DCF     | data capture file                                | JSA     | joint statistical agreement                              |
| DO      | district office                                  | LAG     | language assistance guide                                |
| DOC     | Department of Commerce                           | L/ E    | list/ enumerate  |
| DOD     | Decennial Operations Division                    |         |  |
| DOM     | district office manager                          |         |  |

|        |   |         |   |
|--------|---|---------|---|
| LF     | long form (questionnaire)                               | RD      | regional director   |
| LMR    | late mail return  | REX     | research, evaluation, and experimental (program)                      |
| LQ     | living quarters   | RO      | regional office   |
| LR     | local review  | ROPPERS | regional office personnel and payroll system                          |
| MA     | metropolitan area                                       | ROS     | recruiting operations supervisor                                      |
| MAPPER | maintaining, preparing, and producing executive reports | RT      | regional technician   |
| MAPS   | map automated plotting system                           | SCR     | shipboard census report   |
| MCD    | minor civil division                                    | SDC     | State data center   |
| MCR    | military census report                                  | SF      | short form (questionnaire)  |
| MDO    | master district office                                  | SMD     | Statistical Methods Division  |
| MIS    | management information system                           | SOC     | supervisory office clerk  |
| MO/MB  | mailout/mailback  | SP      | special place   |
| MSSD   | Management and Security Systems Division                | SPOS    | special-place operations supervisor                                   |
| NLQ    | no living quarters                                      | SPP     | special-place prelist   |
| NRFU   | nonresponse followup                                    | SPRT    | special-place regional technician                                     |
| OJT    | on-the-job training                                     | SPSOC   | special-place supervisory office clerk                                |
| OM     | office manager  | SSN     | Social Security number  |
| OOS    | office operations supervisor                            | STSD    | Statistical Support Division  |
| PERS   | Personnel Division                                      | TAR     | tape address register   |
| PES    | post-enumeration survey                                 | TFU     | telephone followup  |
| PL     | public law  | TIGER   | Topologically Integrated Geographic Encoding and Referencing (system) |
| PMR    | postmaster return                                       | TQA     | telephone questionnaire assistance                                    |
| PO     | processing office                                       | TL      | trust land  |
| POB    | place of birth  | UHE     | usual home elsewhere  |
| POP    | Population Division                                     | U/L     | update/leave  |
| PPCIP  | Parolee/Probationer Coverage Improvement Program        | USC     | United States Code  |
| PSU    | primary sampling unit                                   | USPS    | United States Postal Service  |
| PV     | personal visit  | UU/E    | urban update/enumerate  |
| QA     | quality assurance                                       | UU/L    | urban update/leave  |
| QC     | quality control   | WATS    | wide-area telecommunications service                                  |
| RCC    | regional census center                                  | WHUHE   | whole household usual home elsewhere                                  |
| RCS    | recruiting coordination staff                           | WYC     | were you counted  |
|        |   | ZIP     | zone improvement program  |

# CHAPTER 6.

## Field Enumeration

### INTRODUCTION

The field enumeration portion of the census is commonly referred to as the "data collection" phase. The Census Bureau conducted the 1990 census using three basic methodologies: mailout/mailback, enumerator delivery/mailback, and mailout with a door-to-door canvass. Ninety-five percent of the population was counted by mail census procedures. On or about March 23, 1990, (about 9 days before Census Day April 1), the Census Bureau mailed or delivered over 96 million questionnaires to housing units across the United States. Instructions on the questionnaire asked respondents to complete the form and return it by mail or hold it for pickup by an enumerator.

In sparsely populated areas, the Bureau decided to conduct a door-to-door census. For 1990, this traditional (or "conventional") method of census-taking was referred to as "list/enumerate." A few weeks prior to Census Day, the U.S. Postal Service (USPS) delivered unaddressed short-form questionnaires (called advance census reports) to the housing units in these areas. These questionnaires instructed respondents to complete the form and hold it for pickup. Around Census Day, enumerators began to go door-to-door to list addresses, spot the living quarter locations on census maps, pick up completed questionnaires, and interview respondents who had not completed their questionnaire or for whom a sample long form was needed. (The short form—sometimes referred to as the "100-percent form"—contained the population and housing questions asked for all households and residents; the long form, or sample form, had all these, plus items asked only at a sample of the households. See ch. 14 for details.)

During this time, enumerators began to deliver questionnaires to approximately 11 million housing units in certain parts of the country, classified as update/leave (see p. 31) areas. Respondents in these areas were instructed to complete their questionnaires and return them by mail.

Several weeks after Census Day, enumerators visited all housing units that did not return a completed questionnaire in mailback census areas and visited or telephoned some of those that had returned an incomplete questionnaire. They later rechecked addresses that were classified as vacant or deleted, to confirm their status and make sure that all housing units and persons were counted.

After these and other coverage improvement checks, the Bureau asked local officials to review selected counts for the blocks in their jurisdictions. After it investigated significant discrepancies in the counts and made changes where appropriate, the Census Bureau tabulated the data and provided the Department of Commerce (DOC) with

population counts for the 50 States and the District of Columbia. The Secretary of Commerce delivered these counts to the President on December 26, 1990.

The 1990 census was the first national census that used computers at the district office (DO (district office is a term used to describe local field offices)) level to check in, monitor, and check out questionnaires. Applicant, employee, and payroll data were kept on computer files in the DO's. Data collection operations were structured, monitored, and evaluated using computer programs available in the DO's, regional census centers (RCC's), and headquarters. Detailed budget authorizations, cost and progress information, and management reports were available from the DO database systems. The extensive and relatively successful use of automation in the 1990 census meant that the Census Bureau sustained the revolution it began 100 years ago with the first mechanical tabulation of data for the 1890 census.

The field enumeration phase of the census was the culmination of years of planning, testing, and evaluation. The Field Division established 13 RCC's that managed 449 temporary DO's<sup>1</sup> opened throughout the 50 States and the District of Columbia to implement this phase of the census. These field offices recruited, selected, processed, trained, and managed a field work force of over half a million people and enumerated close to a quarter of a billion persons. The following information details this task and provides specific insight into the 1990 census's operational complexities. (Field activities in Puerto Rico and the outlying areas are discussed in ch. 13.)

### ORGANIZATION

#### Regional Census Centers (RCC's)

The field enumeration or data collection was the responsibility of the Bureau's Field Division. RCC's were established in each of the Bureau's 12 permanent regional office (RO) cities for the duration of the census. The 12 RO cities were Atlanta, Boston, Charlotte, Chicago, Dallas, Denver, Detroit, Kansas City (KS), Los Angeles, New York, Philadelphia, and Seattle. In addition, the Los Angeles RO established a RCC in San Francisco to facilitate the enumeration of California and to manage the large number of DO's there. The San Francisco RCC was under the control of the Los Angeles regional director (RD). Under

<sup>1</sup>In addition to these 449 operational DO's, there were 38 type 4 DO's (see p. 7) which were extensions of other existing DO's, subordinate to the parent DO where they were located.

the authority of the Field Division's 12 RD's, the 13 RCC's were responsible for data collection and provided administrative, recruiting, automation, procedural, and geographic support to the DO's. One to three assistant regional census managers (ARCM's), under the authority of the RD, managed the decennial census activities within their region and reported directly to the RD. Each RCC, with the exception of San Francisco, was located relatively close to its parent RO.

From the time the RCC's began opening in late 1987 until early 1991, there were two regional boundary systems. The regional office boundaries, operational before the 1990 census, were followed for all Bureau activities (current surveys, informational services, etc.) other than the 1990 census. The decennial boundaries system, used specifically for the 1990 census, was established so the RCC regions would avoid crossing State boundaries, with the exception of New York. (See map, fig. 1.)

### Master District Offices/Basic District Offices (MDO's/BDO's)

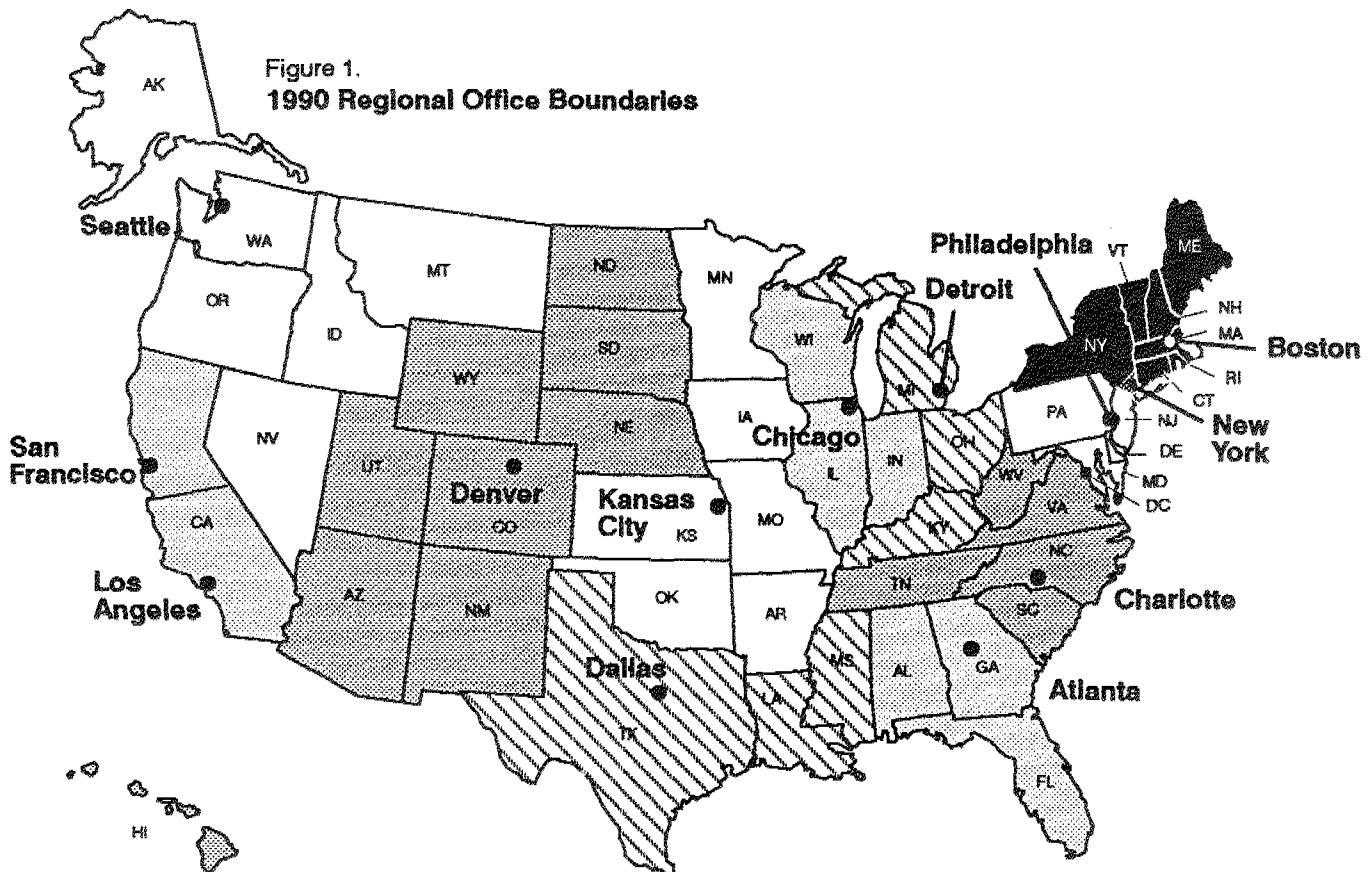
In all, there were 449 temporary DO's established in the 50 States and the District of Columbia. Offices were classified as either MDO's or BDO's. To avoid the significant costs associated with opening all DO's for the precensus activities and keeping them open for postcensus activities, several DO areas were grouped together. Within

each group, one DO was designated as the MDO. The remaining DO's in each MDO group were called BDO's. The RCC's were asked to delineate MDO boundaries in late 1987, and by September 1988, these were complete. Early in 1989, 109 MDO's opened for precensus operations such as the 1989 prelist, advance post office check (APOC), APOC reconciliation, and prec canvass. These MDO's remained open (although some were changed) in the latter part of the census for postcensus local review and recanvass activities. The BDO's opened on a staggered basis from late 1989 until early 1990.

RCC's were allowed to collapse BDO's back into MDO's prior to the start of the postcensus local review operation (see p. 45); because some of the largest postcensus workloads were not centered around original MDO's, there would be more efficient management of postcensus activities from a newly aligned set of MDO's. By October 24, 1990, all but eight of the BDO's were closed; the remainder, located in the New York and Detroit RCC's, closed at the end of October. All MDO's were closed by mid-November. (See app. 6A for a list of MDO's/BDO's by RCC and their opening/closing dates.)

### Type, Description, and Number of District Offices

Each DO covered an area with an approximate population of 557,000. The Census Bureau established five kinds of DO's for the 1990 census: types 1, 2, 2A, 3, and 4.



**Type 1 offices**—The 103 type 1 DO's were similar to the centralized ones used in the 1980 census. They covered very large central-city areas (often including some suburbs) that had numerous multiunit structures, which the Bureau had determined to be difficult to enumerate despite the use of the mailout/mailback method of enumeration. Each type 1 DO was responsible for about 175,000 housing units, most of which were in tape address register (TAR) areas. A TAR area was one for which the Bureau had purchased address lists from a commercial vendor and geographically coded most of the addresses by computer. (See ch. 4 for details.)

**Type 2 offices**—The 197 type 2 DO's generally covered smaller-city, urban/suburban, and some rural areas, mainly through mailout/mailback enumeration procedures. Each type 2 DO was responsible for about 260,000 housing units—approximately 60 percent nationally in TAR areas and the rest in prelist areas,<sup>2</sup> i.e., those where enumerators compiled the address list and spotted the housing units on census maps. (See ch. 4 for details.)

**Type 2A offices**—The 79 type 2A DO's covered urban/suburban, rural, and seasonal-population areas in the South and Midwest. These areas were designated for type 2A offices because the Bureau anticipated problems with the postal delivery of questionnaires, such as in seasonally populated areas and those with a large number of rural routes. Each type 2A DO was responsible for about 270,000 housing units, of which approximately 20 percent nationally were in TAR areas; another 25 percent had been prelisted in 1988, and the remainder prelisted in 1989. The TAR and 1988 prelist areas had a mailout/mailback census; elsewhere (in the 1989 prelist areas), enumerators used the update/leave method where they visited housing units, updated the address list and census maps, and left addressed questionnaires for the residents to complete and mail to a DO.

**Type 3 offices**—The 70 type 3 DO's, which were similar to the conventional offices in the 1980 census, covered the sparsely settled rural areas of the West and the more rural parts of the northernmost States, as well as certain seasonal housing areas. Each type 3 DO was responsible for about 215,000 housing units, of which approximately 20 percent were in TAR areas, 30 percent were in 1988

<sup>2</sup>Prelist refers to an operation in which the Bureau had enumerators systematically canvass assigned areas for which they listed and map-spotted all living quarters. These lists underwent various postal updates and then were used to mail census questionnaires to households. Areas where addresses were compiled using this method were referred to as 1988 prelist areas. There was a 1989 prelist operation to compile addresses for units for which enumerators delivered questionnaires during an operation titled update/leave (see p. 31). The 1989 prelist operation was conducted generally in areas where addresses were less specific and might not relate to an individual housing unit. The addresses compiled during the 1989 prelist operation did not undergo any postal updating. Areas where this type of address compilation took place were called 1989 prelist areas or update/leave areas. These prelist areas are defined in detail in ch. 4.

prelist areas, and the remainder were canvassed by the list/enumerate (L/E) method. In L/E areas, enumerators located housing units, listed their addresses, map spotted the locations on census maps, and collected and/or completed the questionnaires. The type 3 DO's on the average covered a much larger geographic area than the other DO's.

**Type 4 offices**—In addition to the 449 operational DO's, there were 38 type 4 outreach DO's. They did not have enumeration responsibilities and were subordinate to the DO in which they were physically located. These offices were established in areas away from the primary DO where there was a need for a census presence. Type 4 offices were small, had no administrative staffs or computer systems, and were used for administrative and outreach programs as well as training space for the field operations supervisors (FOS's) and the Census Awareness and Products Program (CAPP) staff for promotion of the census. These offices generally were located in free space provided by the community, such as schools, churches, and firehouses. The majority of these offices were open for less than 3 months.

Table 1 shows the actual average office workload size by type of office and the average number of housing units (HU's) covered by each.

**Table 1. Estimated Number of Housing Units, by District Office Type**

| Type of DO    | Number of DO's | Average 1990 housing units |
|---------------|----------------|----------------------------|
| Total .....   | *449           | *236,000                   |
| Type 1 .....  | 103            | 175,000                    |
| Type 2 .....  | 197            | 260,000                    |
| Type 2A ..... | 79             | 270,000                    |
| Type 3 .....  | 70             | 215,000                    |

\*Total and averages do not include 38 type 4 offices since these DO's were extensions of other existing DO's.

Note: Figures for the average number of housing units are estimates as of January 1990; actual census numbers varied.

Source: Field Division estimates as of January 1990.

Table 2 lists the RCC's and their component DO's, by type and the total number of MDO's and BDO's per RCC. The mailout/mailback, update/leave, list/enumerate, and other census operations are described in more detail beginning on page 25.

## District Office Boundaries

The Field Division drew the preliminary 1990 DO boundaries in late 1986 and early 1987, and Census Bureau management, various divisions at headquarters, and the regions reviewed them. Evaluations considered such items as the number of HU's, location of American Indian reservations, congressional district boundaries, the number of multiunit structures, and crime and poverty rates. Media areas for publicity and census methodology also



**Table 2. Number and Type of District Offices, by RCC**

| RCC name           | DO total* | Type 1 | Type 2 | Type 2A | Type 3 | MDO | BDO |
|--------------------|-----------|--------|--------|---------|--------|-----|-----|
| Total.....         | 449       | 103    | 197    | 79      | 70     | 109 | 340 |
| Boston.....        | 37        | 13     | 16     | 0       | 8      | 8   | 29  |
| New York**.....    | 28        | 22     | 6      | 0       | 0      | 8   | 20  |
| Philadelphia.....  | 45        | 16     | 25     | 0       | 4      | 13  | 32  |
| Detroit.....       | 38        | 6      | 24     | 4       | 4      | 8   | 30  |
| Chicago.....       | 41        | 12     | 26     | 1       | 2      | 10  | 31  |
| Kansas City.....   | 34        | 2      | 12     | 16      | 4      | 8   | 26  |
| Seattle.....       | 23        | 0      | 8      | 0       | 15     | 7   | 16  |
| Charlotte.....     | 39        | 2      | 14     | 23      | 0      | 9   | 30  |
| Atlanta.....       | 40        | 7      | 19     | 14      | 0      | 10  | 30  |
| Dallas.....        | 42        | 10     | 7      | 20      | 5      | 9   | 33  |
| Denver.....        | 31        | 0      | 9      | 1       | 21     | 6   | 25  |
| Los Angeles.....   | 30        | 8      | 18     | 0       | 4      | 8   | 22  |
| San Francisco..... | 21        | 5      | 13     | 0       | 3      | 5   | 16  |

\*DO totals do not include type 4 offices or DO's in Puerto Rico.

\*\*The New York RCC DO total does not include nine type 3 DO's for Puerto Rico.

Note: MDO and BDO totals reflect numbers prior to postcensus realignment.

were factors considered. In certain areas and DO's, some overlap of census methodology occurred. All type 3 DO's (except two) conducted list/enumerate operations in most areas, but these DO's also contained areas which were prelisted and used type 2 procedures. By mid-1987, all DO boundary reviews were reconciled and were approved by late 1987. With very few exceptions, DO areas did not cross State lines. Most counties were not split between DO's unless the population was too large to be enumerated by one DO.

### Role of Processing Offices (PO's) in Urban Data Collection

There were seven PO's established to handle the workload for the 1990 census. They were located in the following cities: Albany, NY, Austin, TX, Baltimore, MD, Jacksonville, FL, Jeffersonville, IN (in the Bureau's permanent facility there), Kansas City, MO, and San Diego, CA.

When deciding which PO to assign to an individual DO, geography, transportation, costs, compatibility, and other factors were taken into consideration.

The 1990 census incorporated each of the seven PO's directly into the data-collection phase of the census. Field collection and data capture activities were concurrent during the 1990 census. Mail-return questionnaires for type 1 DO's were returned to their respective PO's for check-in, data capture, computer edit, and telephone followup, not to the DO's. The PO's sent the mail-response rates to the type 1 DO's weekly. Mail returns that failed edit and could not be resolved by telephone in the PO were sent to the proper DO for personal visit. Enumerator returns resulting from nonresponse followup (NRFU) were checked in, boxed, and shipped by the DO to the appropriate PO for data capture and edit. All mail and enumerator returns for type 2 and 3 DO's were checked in and edited in the DO, up until the time they were shipped to the PO's for data

capture and further processing. The PO's assisted the urban data collection effort (type 1 DO's) in numerous ways. From March 18 until September 30, 1990, residents in type 1 DO areas were able to call a toll-free telephone number to receive assistance in completing their questionnaires or to participate in the "Were You Counted?" campaign (see p. 53).

Each PO had one person who acted as a liaison with the various RCC's within the PO area. The field processing office liaison was an RCC regional technician in the PO, who formally reported to the ARCM in the RCC. The liaison's primary responsibility was to ensure the timely and complete transmittal of all census documents and materials. (Specific details on processing offices can be found in ch. 7.)

## OFFICE ORGANIZATION

### Regional Census Centers (RCC's)

Each RCC oversaw census operations for 21 to 45 DO's (see table 2). RCC personnel leased DO space, trained key DO supervisors and automation personnel, monitored the cost and progress of operations in the DO's, worked on DO payrolls, and had the responsibility for assuring the timely completion and acceptable quality of field work. Each RCC was headed by the regional director (RD), but day-to-day management responsibilities were handled by the assistant regional census manager (ARCM).

In carrying out this management responsibility, the ARCM had the assistance of an administrative supervisor, an automation supervisor, and several area managers. In addition, there was a census recruiter, census information officer, geographic coordinator, Census Awareness and Products Program (CAPP) coordinator, and media specialist. Each RCC also employed an equal employment opportunity (EEO) specialist, who reported to the RD.<sup>3</sup>

Liaison with the DO's was carried out through the RCC's area managers and their respective regional technicians. The area manager (AM) position was new for the 1990 census; it was established to provide greater contact within the regions between the RCC's and their DO's. Area managers were the direct supervisors of the district office managers (DOM's). They trained the managers and were the primary source of information in the planning and operational stages of the census. Regional technicians (RT's) had specialized experience with special places; general administration; automation; research, evaluation, and experimental (REX) programs; quality assurance; and processing. Some regional technicians worked in the RCC's, assisting the area managers, and others were in the field providing technical assistance to the DO's. The DOM's

<sup>3</sup>For technical advice on the applicability and interpretation of EEO statutes and regulations, EEO specialists turned to the Office of Civil Rights, U.S. Department of Commerce.

handled most general problems in the DO's. Although RT's served as advisors to the office managers, they sometimes had line authority in the DO's to handle unusual situations.

### **Geographic Update System (GUS)**

Each RCC contained a GUS, the computer system by which updates were entered into the Topologically Integrated Geographic Encoding and Referencing (TIGER) file by a process called digitizing. The area where this work was performed was known as the GUS site. The RCC's performed several different cycles of digitizing during the decennial period. (Specific details about the digitizing update operations and other geographical topics are covered in ch. 3.) A detailed RCC management organization chart is shown in figure 2.

### **District Offices**

1990 DO office organization differed from the 1980 census, when the DO staff varied greatly depending upon office type. For the 1990 census, management and administrative staff was virtually the same from one type of DO to another. (Figure 3 displays the organizational breakdown of the 1990 census DO's.) All offices were managed by a DOM, who was responsible for the overall DO operation, assuring that work was done on schedule, according to instructions, and within budget. The DOM served as the Bureau's principal spokesperson to the public, media, and government officials. The DOM was aided by four assistant managers, one recruiting operations supervisor, and one administrative assistant. The administrative assistant clerically supported the office management staff. Most type 1 DO's had a census community awareness specialist (CCAS), who assisted the DOM with many media and outreach activities during peak census operations. This person was supervised by the CCAS team leader in the RCC.

The assistant manager for office operations (AMOO) was responsible for all office operations. Depending on office type, these included questionnaire and telephone assistance, telephone followup, edit review, assignment control, office coding, merge, and vacant/delete preparation. The AMOO also served as the DO postal liaison, managing contacts with local post offices and the RCC postal liaison and observing postal training on census operations. The AMOO could appoint an office operations supervisor (OOS) to serve as a second shift supervisor during peak operations.

The assistant manager for electronic data processing (AMEDP) was responsible for the entire automated data-processing operation within the DO. Some of the AMEDP's responsibilities included updating the address control file by loading the update tapes from headquarters and maintaining the collection control file, transmitting data electronically and by tape, managing all keying operations, and

operating various pieces of peripheral equipment. Like the AMOO, the AMEDP had the option of hiring an EDP operations supervisor who managed the EDP second shift for peak operations only.

The assistant manager for administration (AMA) was responsible for administrative activities, including payroll, personnel, supplies, telephone/mail management, control of all shipments to the RCC or PO, and centralized selection of all job applicants. Reporting also to the AMA was a stock and supply assistant who was responsible for DO inventories and resupply efforts.

The assistant manager for field operations (AMFO) managed all data-collection field operations and some related office activities. The AMFO also made the field staff selections. As can be seen from the DO organizational chart in figure 3, the AMFO was assisted by field operations supervisors (FOS's). The FOS directly supervised field operations by overseeing crew leaders (CL's). FOS's generally were not located in the DO; they worked in the field, out of their homes, or from other space donated for census use that was centrally located in each FOS's area of responsibility. The number of FOS's varied with the size of each office's workload. Crew leaders supervised enumerators. A ratio of one CL to every eight enumerators was recommended, but budget constraints kept these ratios at 1:9 for type 1 and type 3 DO's.

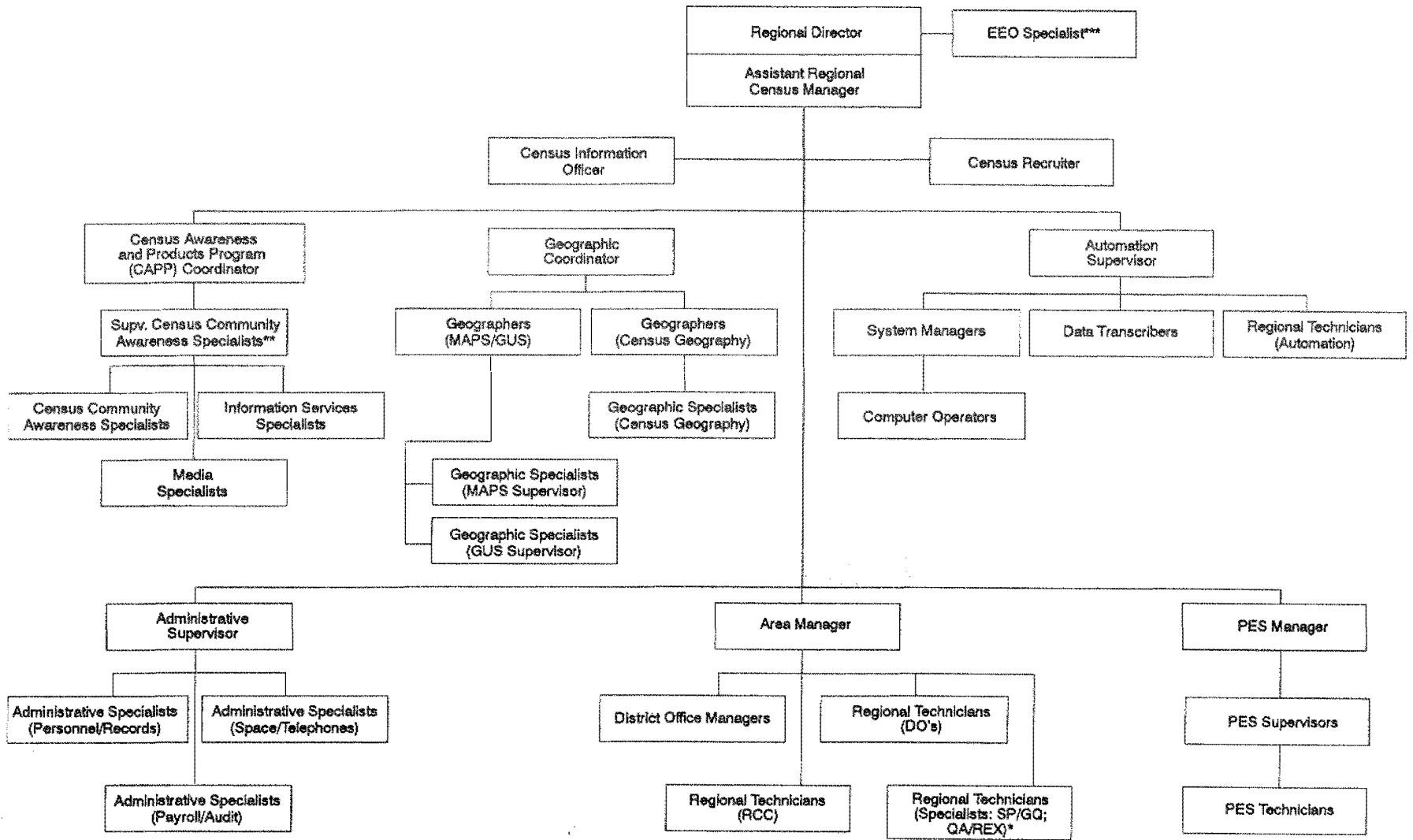
Each DO had a separate section for special places within the AMFO's area, managed by a special-place operations supervisor (SPOS). (Special-place operations are defined and discussed beginning on p. 48.) The SPOS was responsible for all activities associated with the contacting, listing, classification, and enumeration of special places. The SPOS trained and supervised special-place crew leaders and a supervisory office clerk (SOC) and clerks who did the preparatory work for the enumeration and prepared completed materials for transmittal to the PO.

## **LOGISTICS**

### **Space**

The leasing program/process for the Data Preparation Division's (DPD's) warehouse space, PO's, DO's, and RCC's was administered by the real property contracting officers of the Administrative and Publications Services Division<sup>4</sup> (APSD) under the authority delegated to the Director (through the Secretary of Commerce) from the General Services Administration (GSA). Initial space requirements were defined in November 1986. The leasing process ended with the last DO lease (Yakima, WA) signed

<sup>4</sup>The Administrative Services and the Publications Services Divisions were combined in February 1990 and are referred to as the Administrative and Publications Services Division (APSD). Further text references will use APSD.

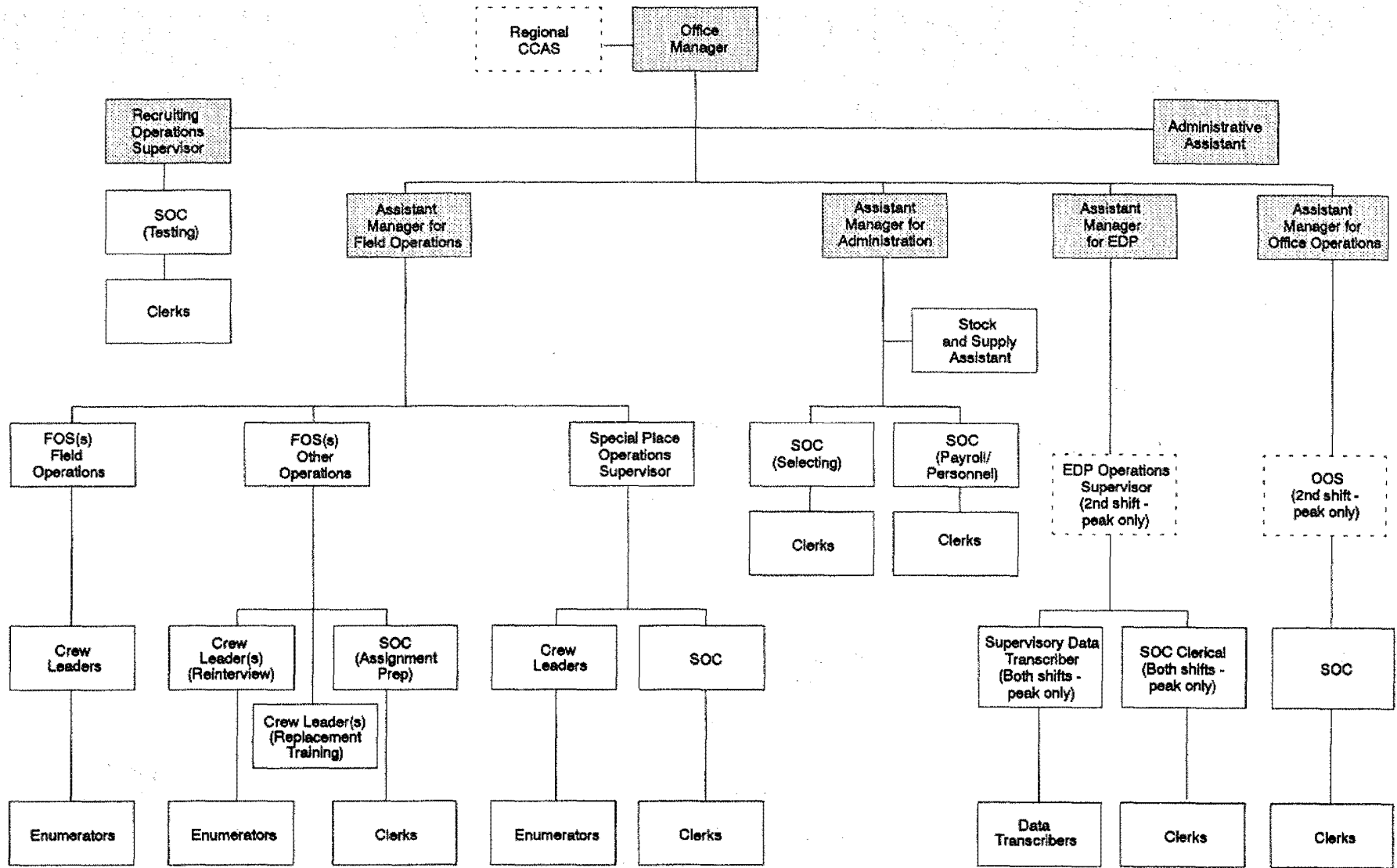


\* One position per RCC (reported to senior area manager.)

\*\* One to five specialists in each region were designated as team leaders.

\*\*\* For technical guidance, the equal employment opportunity (EEO) specialist relied on the Office of Civil Rights, U.S. Department of Commerce.

Figure 2. Regional Census Center Management Chart



Full-time positions are in shaded boxes. All full-time positions came on board when the district office opened. Remaining staff were appointed according to entrance-on-duty (EOD) dates as specified for scheduled census operations.

Figure 3. District Office Organizational Structure

on December 4, 1989. The participating divisions in the space acquisition program included APSD, DPD, Decennial Operations, Field, and Decennial Planning. The Bureau of the Census used Government-owned or -leased space whenever possible.

The APSD real property contracting officers negotiated and signed the leases for 12 of the 13 RCC's and 6 of the 7 PO's (the Seattle RCC was acquired by GSA and the Jeffersonville PO required only additional warehouse space which APSD leased).

APSD and Field Division (FLD) jointly developed a leasing manual and scheduled five training sessions across the country for selected RCC officials. After completion of this course, interim warrants were issued and the authorization to lease property for the 1990 census was delegated to certain FLD regional officials, such as ARCM's, by the chief of APSD. This provided the RO personnel with the authority to negotiate and sign leases for temporary DO space. All lease actions by FLD personnel were reviewed by the APSD fully warranted contracting officers prior to award.

The space for data-collection and data-capture activities included 13 RCC's, 487 DO's, 7 PO's, and the DPD warehouse requirements. There were 487 DO leases (including 38 type 4 offices)<sup>5</sup> negotiated for about 4 million square feet, at a cost of \$74.8 million. Typically, the 109 stateside master district office (MDO) leases were the most costly, since these offices were open longer—an average of 21 months. Approximately 929,000 square feet of space was leased for the MDO's. The remaining 348 basic district office (BDO) leases were negotiated for an average of 8 to 12 months. Most BDO's were leased with a renewal clause for a 90-day extension that permitted them to remain open after August 15, 1990, on a prorated daily basis. Some BDO's opened late due to lease problems and/or space modifications that prevented occupancy.

The average RCC space was 21,000 square feet, about twice the size of the 1980 RCC's. The extra space was needed because of additional personnel, computer and map-reproduction equipment, and storage requirements for 1990. The cost of space leased for the 13 RCC's was \$25 million.

DO space requirements were based on the type of office and the estimated housing-unit workload. The average DO had between 5,000 and 12,000 square feet. Type 1 DO's did not require the space that type 2, 2A, and 3 DO's needed, since mail-return questionnaires for type 1 DO's were sent directly to the PO. Typically, type 1 DO's had approximately 6,000 square feet; type 2, 2A, and 3 offices averaged between 7,500 and 10,000 square feet. Many type 2 DO's were overcrowded during peak activities due to the lower-than-expected mail response, which generated large followup workloads. Some type 1 DO's experienced problems maintaining night shifts because

<sup>5</sup>Most type 4 DO's were located in donated space. All census space (rented or donated) was covered by a leasing document.

employees did not consider the areas safe after dark. DO's locations had to be within the boundaries established for data collection. FLD delineated areas based on workloads in terms of housing units and/or geographic areas. Locations had to be in areas that contained adequate labor pools for census recruiting, possessed economic conditions that enabled the Bureau to appeal to the local labor force, and were accessible to major highways and transportation networks.

The architectural design and floor plans were developed by the FLD and Decennial Operations Division (DOD) in cooperation with the APSD and its independent engineering contractor. Floor plans and building layouts had to accommodate the flow of work, and electrical power had to be sufficient for special-purpose equipment, such as the computer systems. Buildings had to be specially air conditioned due to the presence of computers and other electronic equipment. Hourly overtime rates for building personnel varied from building to building and caused operational costs to increase. Many locations, as expected, experienced frequent overtime requirements. Air conditioning and/or heating to accommodate this need beyond normal building hours ran into the hundreds of thousands of dollars. Although renovations varied considerably among the different types of office space, they were a condition of the lease and were the responsibility of the lessor to accomplish within specified time periods. Payments were made by lump sum or by incorporating the costs into the square-footage rate.

Specific descriptions of the building requirements accompanied each solicitation for offer; for example, offices had to have floor areas that were level and non-slip; all exits, corridors, aisles, and passageways had to comply with national fire-protection standards. Operable windows had to be weathertight and equipped with locks; off-street, ground-level windows and those accessible from fire escapes and adjacent roofs were required to have exterior grilles unless waived by the contracting officer. Separate toilet facilities for men and women had to be provided on each floor occupied by the Government, with specific accommodations for handicapped persons. Door widths and elevators capable of handling supplies were problems at several DO's.

## Supplies, Furniture, and Equipment

Acquisition of furniture, equipment, and miscellaneous supplies for the 13 RCC's was a large undertaking. In 1986, APSD and the Procurement Office for the Census Bureau met to establish procurement guidelines and identify sources of supplies for the RCC's. Regional offices worked through their regional administrative support centers' procurement staffs to obtain the estimated five to seven trailer loads of furnishings and equipment required to open each RCC. Shipping costs for furnishings, supplies, and the shipping of questionnaires to processing offices, including the relocation of equipment and furnishings for the DO's and the RCC's as these offices closed,

was over \$18 million for the 1990 census. Approximately \$4 million was spent on shipping for the 1980 census, but comparisons cannot be made; shipping parameters varied, since shipping questionnaires between DO's and the PO's was not budgeted in these costs for 1980.

RCC's could order specific furniture or equipment without headquarters approval. RCC's were encouraged to work with GSA to obtain as much surplus furniture and equipment as possible. The cumulative cost for special office equipment, supplies, and maintenance agreements for the RCC's from 1988 through May 31, 1991, was approximately \$3.2 million. The total cost of furniture and equipment for the RCC's was over \$2.3 million, or an average per RCC of \$180,000. The cost per RCC varied with the ability to obtain surplus items.

Supplying the DO's was a massive and complex operation that involved a great deal of advance planning, procurement, and cooperation among various divisions at the Bureau, and dependence on other Government agencies, particularly GSA and Government Printing Office (GPO). Although most DO's received their materials in a timely manner, there were some instances when materials did not arrive on time or in sufficient quantities. In some cases, lack of training materials caused minor delays in scheduling. Overall, the complex supply and resupply operation was handled successfully. The most significant delay was in the contractor's delivery of addressed long-form questionnaires for the update/leave operation; these were not received until mid-March, approximately 1 month late.

Field Division's Resource Planning Branch and DPD planned logistical aspects for the 1990 census. They had to forecast every RCC's and DO's need for supplies and equipment. Field Division originally proposed that furniture, equipment, and telephones be made part of the solicitation-for-offer leasing packages for the 1990 DO's, but this proposal was turned down because it was contrary to GSA procurement regulations. New furniture was purchased for all type 1 and type 2 DO's. Used furniture was acquired from the Air Force for most type 3 DO's.

For the 1980 census, bulk materials were shipped from three PO's, but for 1990 they all came from the DPD in Jeffersonville, IN. Each RCC and DO required special materials such as questionnaires, procedural manuals, field-use forms, and training guides, as well as normal office supplies and equipment such as paper, pens, tape, desks, and chairs. Some of the major items purchased included 68,000 cardboard desks, 25,000 cardboard tables, 75,000 folding chairs, 9.4 million specially embossed 1990 pencils, 1.3 million pocket-sized sharpeners, 24,000 sheets of correction dots used for editing questionnaires, 50,000 red lectern-type three-ring binders (used by CL's for training enumerators), 504,000 acetate holders for enumerator identification cards, 320,000 plastic portfolios for crew leaders and enumerators, and over 40,000 boxes (2,500 sheets each) of computer paper for use in various operations.

The cardboard desks and tables, first used in the 1970 census, and plastic portfolios were inexpensive alternatives to buying or renting large numbers of wooden desks or buying briefcases. Shelving and boxes to store questionnaire work units were shipped from DPD. The computer paper orders were unique to the 1990 census because each DO (for the first time) printed its own address registers for various operations.

A major category of equipment was the short-term rental of videocassette recorders (VCR's) and television monitors for each DO. Each DO was allowed one VCR and a monitor for various training sessions that required this equipment. The Bureau had budgeted low-volume copiers for the DO's to use for payroll purposes. In reality, DO's used these machines for duplication of outreach material, forms, training materials, and general notices for the DO staffs, which exceeded the budgeted funds for these items. Total costs for regular office furniture, equipment, and general supplies (excluding computers for the DO's) for the 449 DO's from 1988 until May 31, 1991, were approximately \$17.8 million.

In addition to the numerous supply items and office equipment that had to be purchased and shipped to various locations, the Bureau had to design and write numerous manuals, training guides, self-studies, job aids, and field-use forms. Most of the printing of 1990 census manuals, training guides, and forms was done by private contractors under GPO auspices. (Printing of the major data-collection forms, such as the short- and long-form questionnaires, is discussed in ch. 4. App. 6C describes the field-use form numbering system and lists individual operational manuals and training guides. Facsimiles of selected field-use data-collection forms appear in app. 6D.)

**Kit assembly and shipment**—The FLD Project Management Staff and two branches—Resource Planning, and Procedures and Training—developed the training and specified the components of the various instructor, trainee, and supply kits. Major steps in kit preparation and development were identification, development of specifications, acquisition, staging, assembly, shipping, and control of inventory for resupply. Kit components and quantities were determined from procedural and training manuals, historical files (experiences gained from pretests, the 1988 dress rehearsal, and 1988-89 prelist operations), and budget authorizations. Most supplies were contracted out from suppliers and stored in DPD. Shipping of these supplies along with other required materials was done by private carriers. There were 160 different types of kits, and the total number of kits exceeded 2.6 million. The Decennial Operations Division (DOD) required 2,800 kits, and the Decennial Planning Division (DPLD) requirements were as follows: Outlying area enumeration, 3,000 kits (see ch. 13); military and maritime ship enumeration, 1,900 kits; and education promotion, 242,000. The remaining kits were used to train DO management, office, and field staffs.

One variation from the 1980 census was the development of a "basic supply package," which was prepackaged and provided such things as pens, pencils, sharpeners, writing paper, paper clips, and identification badge holders in a generic package. There were three basic types of these—instructor, trainee, and supply, allowing the preassembly of basic items common to all operations.

As an example, the "Nonresponse Followup Enumerator Supply Kit" for TAR areas, of which 462,900 were prepared, contained the following items.

| Form   | Title/Description   | Quantity              |
|--------|---|-----------------------|
| D-1A   | Enumerator-Friendly Short-Form Questionnaire              | 60                    |
| D-2A   | Enumerator-Friendly Long-Form Questionnaire               | 10                    |
| D-20A  | Individual Census Report, Short Form                      | 2                     |
| D-20B  | Individual Census Report, Long Form                       | 2                     |
| D-26   | Census Appointment Record                                 | 20                    |
| D-27   | Introduction for Spanish-Speaking Respondents             | 5                     |
| D-31   | Privacy Act Notice  | 1 pad (100 per pad)   |
| D-40   | Individual Census Report Envelope                         | 4                     |
| D-60   | Foreign Language Guide                                    | 1 set (32 languages)  |
| D-157  | Questionnaire Misdelivery Record                          | 10                    |
| D-308  | Daily Pay and Work Record                                 | 12                    |
| D-376  | Refusal Record  | 3                     |
| D-377  | Deletion Record   | 5                     |
| D-3309 | Language Assistance ID Card                               | 1                     |
|        | One package of basic supplies for enumerator, containing: |                       |
|        | Clip, paper, No. 1-1/8                                    | 1 pkg. (100 per pkg.) |
|        | Eraser, slip-on, wedge-shape                              | 3                     |
|        | Pen, non-retractable, blue                                | 1                     |
|        | Pencil, black, 1990 census logo                           | 3                     |
|        | Sharpener, pocket, pencil                                 | 1                     |

The 1990 census kit assembly schedule required peak production between August 1989 and October 1989. Once all the supplies were accumulated at the DPD supply and assembly depot in Jeffersonville, IN, those that were not set aside as bulk items (cardboard desks and tables, folding chairs, etc.) were assembled into kits. Assembly of a particular kit was scheduled to begin when sufficient quantities of all components had been accumulated and the specification finalized. The Statistical Support Division (STSD) established quality-assurance specifications to assure that kits were accurately prepared and properly shipped. The three plans implemented were 100-percent verification—where all items were checked, discrete sample verification—where supply items were checked at specific intervals, and the continuous sampling plan—which required items to be reviewed at specified numeric intervals.

Sometimes printed materials were received in DPD so late that assembly of some kits had to begin before all the components could be accumulated. Some kits had to be shipped incomplete to the DO's with "short" slips that listed items that were not included in the packaged kits. Incomplete kits were shipped when the majority of items needed were assembled. Most of the time, materials that were short were second-run printed materials that were rush-ordered. These items were sent later in bulk shipments as they were received. Having to partially assemble or short-slip kits caused problems for DPD and the DO's. DO's sometimes had to photocopy training materials to make up for the short-slipped materials, while short-slipping kits forced DPD to expand the number of supplemental shipments to the DO's and the RCC's. Some RCC's transferred supplies from one DO to another, while many DO's had to reorder materials they actually possessed but were unable to locate in their inventory.

In December 1986, the Census Bureau introduced MAPPER (maintaining, preparing, and producing executive reports) as the decennial electronic tracking system to show the status of all forms, manuals, training aids, and other materials to be used in the 1990 census. The system produced five major reports tailored for the five major divisions that were responsible for 1990 census paper products. APSD's Forms and Mail Management Branch made the initial entries into this tracking system, but FLD, APSD, DPD, and DPLD could access the system and change data for their reports. The Resource Planning Branch (FLD) used the MAPPER printout extensively during preparations for the 1990 census.

In November 1989, DPD began storing all orders for supplies in an automated inventory control system (AICS). This system was developed because MAPPER did not cover all the inventory activities that should be monitored during the preparation and management of the census. Kit assembly continued throughout the census and was completed by early September 1990.

Three separate truck shipments were scheduled to each DO. Area managers had to give headquarters 2 weeks' notice of the date the initial shipment for opening the DO was needed. The FLD Resource Planning Branch then forwarded shipping requisitions, which listed materials to be shipped. Arrangements were made by DPD with commercial carriers to deliver the materials on the scheduled date. Since the offices were opened as the leased space became available in each region, many times it was necessary for DPD to prepare and load shipments in 12 to 15 trailers in a day while preparing a like number of shipments to be loaded the next day. The initial shipment to the MDO's began in the fall of 1989 and contained supplies to set up the office and begin operations scheduled before Census Day. If additional space was available on the trailers, any kits or other materials that were ready were loaded. Initial shipments were full-sealed trailer loads with inside delivery and helper service requested and



required by the Bureau. DPD began loading trucks in January 1989 and through July 1990 made 48,240 shipments to DO's with a total shipping weight of over 33 million pounds.

Prior to any of the DO openings, the DPD hired an experienced GSA traffic specialist to coordinate the requirements and contact the commercial transport lines. The DPD also established a commercial parcel service account solely for DO shipments and utilized the GSA overnight carrier contract for emergency shipments. Kits and supplies for Hawaii and Alaska were sent sea/land, or by air freight for accelerated schedules.

In addition to being the sole supply center for the census field operations, the DPD also served as the supply depot and provider of transportation services for the seven processing offices.

Most DO's received their initial shipments on their scheduled dates. Second shipments were scheduled to arrive at the DO's about 2 weeks prior to post-Census Day operations. Maps, training guides, and other office equipment were sent in the second shipment.

**Resupply**—DO's received a set of stock control cards, form D-227, and were instructed to use them for controlling the office inventory. Nonurgent supplies (not needed for 16 days or more) were listed on Form BC-22, Request for Supplies, Equipment, or Service, which was routed from the DO's to their respective RCC's. Emergency supplies could be ordered through the RCC by telephone. Area managers and/or other administrative personnel in the RCC's contacted the Resource Planning Branch at headquarters, where arrangements were made with the supply center in Jeffersonville for overnight shipments.

In spite of the high volume of resupply orders and the nonreceipt of some materials, the supply section in Jeffersonville was able to fill most resupply orders in a timely fashion. Throughout the census, DOM's were instructed to order replenishments at least 16 days in advance. When items were needed in less than 16 days, they were instructed to place emergency orders which were delivered within 2 or 3 days of placement. For items that DPD could not fill expeditiously or where overnight shipping costs were excessive, the regions were told to obtain the items from local vendors using established charge accounts or their agency bank cards.

The unexpectedly low mail response had a major impact on the shortage of enumeration supplies in the DO's. There were sporadic shortages of enumerator-friendly questionnaires<sup>6</sup> (EFQ's) and nonresponse and field followup enumerator training and supply kits due to the large increase in the numbers of enumerators needed to complete the enumeration. Some items in short supply were later located in DO supply inventories, but due to poor

inventory controls and the inability to identify certain items, unnecessary orders were submitted. Edit clerks in some DO's used white paper dots, provided to cover erroneously marked or partially erased answer circles, to cover stray marks made on some questionnaires, resulting in a shortage of white paper dots. Nonresponse followup registers, printed in the DO, had to be reprinted two or three times in some cases due to software problems. This resulted in shortages of computer paper. In some cases, there were spot shortages of particular items, and materials had to be transferred between offices. Some DO supply clerks did not maintain proper inventories, and many items had to be rushed to the DO's via air freight or next-day package service to fill last-minute emergency requests.

## Field Safety and Security

Procedural manuals and training sessions stressed the need for safety practices to avoid injuries and fires, and the importance of maintaining confidentiality of census information and security in the DO. All census field staff received instructions on census confidentiality by verbal training and/or videotape presentation. Every person hired to work as field staff received a Payroll and Administrative Manual, Form D-590, tailored to various positions, that promoted safety and detailed actions to avoid accidents and injuries. All census employees took an oath to abide by Title 13's confidentiality provisions, and had to visibly wear identification badges.

Access to the DO was controlled through the main entrance. Other doors and windows were locked or served only as emergency exits. There was a receptionist at the entrance who registered all visitors and issued badges to them. Anyone who was not a sworn Bureau employee was always accompanied by someone from the DO staff, and he/she was not allowed to enter areas where confidential materials were stored or being processed or where administrative and payroll records were secured. Access to such areas was restricted. To prevent break-ins, DO's were equipped with 24-hour-a-day alarm services tied to the local police or monitor services. Some type 1 DO's had guards; GSA arranged this through private contractors, but in some cases the lessor arranged for security within the existing lease coverage and was reimbursed by the Bureau via supplemental lease agreements. The New York RCC spent over \$700,000 on security guard costs for 11 of its DO's. Total security guard costs for the 13 RCC's totaled \$1.04 million. All DO's were protected by smoke detectors connected to the local fire departments or monitoring services.

The DOM was responsible for DO security and the confidentiality of all census documents. Various building requirements were strictly enforced; for example, DO space was required to have perimeter walls that ran floor to ceiling, and all windows and doors had to be secured and have enough blinds to conceal inside material. All

<sup>6</sup>The EFQ was developed and used for the first time during the 1990 census. Although the EFQ contained the same data items found on the regular questionnaire, it was designed to be read aloud by an interviewing enumerator.

regularly scheduled janitorial service/building personnel were required to submit to a Government security review/screening. Specific guidelines instructed DOM's on the disposition of all materials.

Access to electronic data processing (EDP) areas was restricted on a need-to-be-there basis. EDP supervisors had to maintain a separate log for all persons entering the EDP area. Signs informed visitors to register and delineated restricted areas. Smoking was not allowed inside any training, office, or storage areas.

## Communications

The 1990 telecommunications system was designed to provide voice- and data-transmission capabilities between field offices and headquarters.

The data telecommunications system utilized dedicated leased lines and dial-up lines. Dedicated leased lines connected the 13 RCC's, 12 RO's, 7 PO's, and DPD to headquarters. Various computer data transmissions required dedicated lines to transmit information. DO's communicated with the RCC's using the dial-up lines.

The voice telecommunications system consisted of local, long distance, and toll-free 800 telephone service. The voice system was used for three major decennial operations: telephone questionnaire assistance (TQA), telephone followup (TFU), and "Were You Counted?" (WYC). Telephones also were used for daily administrative functions in the DO's.

Establishing quality telephone service for the 1990 census was a logistic nightmare compared with the 1980 census experience. Since the court-ordered divestiture of the telephone system nationwide, the Bureau had to consult with each local-area telephone company. Adequate telephone line capacity was a major criterion in selecting office space. This responsibility was delegated to the RCC's, which had to initiate all orders for the installation and removal of telephones, and report service problems to the telephone companies. The installation and connection went smoothly in most cases; however, there were a few late installations and equipment problems. Inexpensive rotary-dial phones were used in some DO's for administrative purposes, but were replaced by touch-tone phones with headsets for telephone assistance and followup operations.

There were basically five types of telephone lines used in 1990 field offices: (1) FTS (Federal Telecommunications System), (2) local commercial lines, (3) dial-up lines, (4) dedicated leased lines, and (5) "800" long-distance lines.

The FTS was a nationwide system available 24 hours a day for voice and data communication among Federal Government agencies in more than 500 cities. This system provided the Bureau with a dedicated Federal network that allowed long-distance calls below commercial rates. The FTS was available in many DO's, but was used mostly between headquarters and the RCC's.

The average number of local commercial lines per DO depended on the type of office. There were seven two-line administrative telephones allocated for each DO. FLD was

responsible for the various telephone support operations in type 2 and type 3 DO's. For telephone followup, the average type 2 DO used 17 telephones, and the typical type 3 DO, 14 telephones. Type 1 DO's did not require additional instruments, since telephone followup was conducted out of the PO.

The DO's used dial-up lines to transmit daily and weekly reports to the RCC's. The dedicated leased lines for each RCC were used to transmit summary data for their DO's to headquarters. There were some problems with modem systems used to access the information on dial-up lines; phones that plugged into the modems were not of sufficient quality to maintain consistent contact, and breakdowns usually required retransmission.

Toll-free "800" numbers were used for the TQA operation. In the first 10 days of the operation, over 5.5 million attempts to call were made to DO's and PO's, with slightly less than 30 percent getting through. The overall bill for the "800" service was approximately \$2.3 million. There was one "800" number for English, one for Spanish, and one number for each of six Asian languages (Chinese, Vietnamese, Korean, Laotian, Cambodian, and Thai). The "800" number for English was supported by all type 2 and 3 DO's and by six PO's; the "800" number for Spanish, by six PO's; and the ones for Asian languages, by the San Diego PO and the Los Angeles RCC. Calls were routed from specific area codes/exchanges to specific PO's or DO's. The same "800" numbers used for TQA also were used for the WYC campaign.

There was one national, toll-free "800" number for employees to anonymously report concerns, abuses, or illegal activity to headquarters. Titled the "Decennial Hotline," it was available for all FLD employees in the DO's and the RCC's. The 1990 hotline was the first established primarily for decennial employees to report work-related problems. According to Commerce Department policy, each employee was required to report—either to his/her supervisor or to someone in management—information concerning the possible existence of a violation. If, after doing this, the problem was not resolved satisfactorily, employees were encouraged to call. Employees could initiate a formal grievance procedure when making a complaint. Although all calls were logged, and corrective action was monitored, the hotline was not designed to circumvent normal DO or RO management's responsibility, accountability, or authority. Over 13,700 calls were made to the hotline during the census, of which over 4,800 calls were payroll related. The total cost of the hotline, including equipment acquisition, was approximately \$40,000.

High-speed facsimile transceiver copiers (generally referred to as FAX machines) were installed at headquarters, DPD, PO's, and each RCC to transmit small summary reports or directives between them.

Memorandums and procedural and training updates were sent to the RCC's by an automated two-way mail utility system that took the place of the bulky and time-consuming medium used in the 1980 census. DO's accessed

this system, which could transmit information in a matter of seconds to any RCC or division at headquarters, by utilizing their dedicated lines.

## PERSONNEL

### Recruitment

Recruiting for decennial censuses has always been a tremendously large undertaking. Staffing requirements for census field operations compelled the Bureau to recruit and test approximately 2 million applicants for approximately 500,000 temporary positions. In general, the unemployment rate nationally in the 1990 census cycle was about one-half of what it was during the 1980 cycle, making recruitment difficult in most regions of the country. The Bureau sought help through State employment agencies, national and local civic organizations, minority and women's groups, and other sources. There were some timing and coordination problems when trying to fill available vacancies in a timely manner, so as not to adversely affect operations.

On August 16, 1989, President Bush signed two acts, Public Law (P.L.) 101-86 and P.L. 101-293, exempting Federal and military retirees, including retired postal workers, temporarily hired for the census from any offset in pay and annuities for a period of 270 days (later extended to December 31, 1990). This meant that the Bureau could recruit these people and assure them they would not lose any income by working for the census. (See table 3 for a count of Federal and military retirees and the total number of employees by RCC.)

Further, in October 1989, President Bush signed a waiver, authorized by the 1978 Civil Service Reform Act, allowing use of a supplemental, bipartisan political referral system to fill temporary decennial census positions,<sup>7</sup> and about one-fifth to one-fourth of the supervisory office positions were filled in this manner. (In this system, both Democratic and Republican Senators, Representatives, Governors, and State legislators, as well as mayors, county commissioners, and other local officials could recommend candidates. The waiver order retained veteran's preference. It had been the Bureau's experience in prior censuses that this was an effective method of attracting qualified applicants used to dealing with the public.)

In still other efforts to broaden the census recruitment base, the Bureau negotiated with four different agencies administering five assistance programs to obtain exemptions to their regulations. The Department of Health and Human Services' Aid to Families With Dependent Children program granted an exemption, under its demonstration project authority, to enable program recipients to accept temporary employment without adversely affecting their

**Table 3. Field Enumeration Hiring, Including Federal and Military Retirees**

(Does not include DOD/PO employees)

| RCC name           | Federal retirees | Military retirees | Total retirees | Total field employees |
|--------------------|------------------|-------------------|----------------|-----------------------|
| Total.....         | 10,684           | 9,237             | 19,921         | 552,525               |
| Boston.....        | 746              | 389               | 1,135          | 43,697                |
| New York.....      | 139              | 45                | 184            | 43,174                |
| Philadelphia.....  | 1,250            | 653               | 1,903          | 58,965                |
| Detroit.....       | 498              | 278               | 776            | 36,534                |
| Chicago.....       | 358              | 155               | 513            | 37,672                |
| Kansas City.....   | 865              | 629               | 1,494          | 36,970                |
| Seattle.....       | 1,050            | 1,180             | 2,230          | 32,382                |
| Charlotte.....     | 1,657            | 1,599             | 3,256          | 58,968                |
| Atlanta.....       | 994              | 1,590             | 2,584          | 56,259                |
| Dallas.....        | 1,266            | 1,191             | 2,457          | 48,599                |
| Denver.....        | 1,022            | 653               | 1,675          | 28,957                |
| Los Angeles.....   | 430              | 505               | 935            | 46,872                |
| San Francisco..... | 409              | 370               | 779            | 23,476                |

Source: Regional Census Center Memorandum No. 91-D-36, numbers accumulated from August 1, 1989, to February 23, 1991.

program or benefit eligibility. The Department of Agriculture, with food distribution programs on American Indian reservations and food stamp programs nationally, granted similar exemptions. These exemptions were effective from March 1 through August 31, 1990.

The Departments of Housing and Urban Development (HUD) and Interior (Bureau of Indian Affairs) granted exclusions, under the authority of their respective Secretaries, to assist the Census Bureau in recruiting a sufficient work force for the census. The exclusions disregarded income earned as a result of decennial census employment. Thus, program beneficiaries could earn income without affecting their eligibility for the duration of the census.

All of these provisions enhanced the Bureau's recruitment efforts.

One of the major recruiting goals was to attract a work force in each DO that was representative of the local labor force with respect to race, ethnicity, and language, and to hire enumerators to work in the areas in which they resided. To track recruiting progress, the Bureau used the civilian labor force profile compiled from data gathered during the 1980 census. To meet this goal, the Bureau contacted many diverse sources of job candidates. It established a Recruiting Coordination Staff (RCS), comprised of the Field Division recruiting coordinator and support staff. In addition to the RCS at headquarters, there was at least one regional recruiting coordinator in each of the 13 RCC's who supervised recruitment efforts. The Census Awareness and Products Program (CAPP) staff assisted in identifying and contacting civic groups, minority groups, homeless organizations, hard-to-enumerate groups, and influential persons in local communities to aid in recruiting applicants. Each DO had a recruiting operations supervisor (ROS) responsible for recruiting and testing applicants to fill various DO field positions.

Two automated personnel systems maintained employment information: The Regional Office Personnel and

<sup>7</sup>In March 1979, President Carter signed a similar waiver for the 1980 census.

Payroll System (ROPPERS) was used to reduce paperwork and to process all information for all full-time RO, RCC, and DO personnel. The Decennial Operations Personnel and Payroll System (DOPPERS) maintained employment information on intermittent DO staff. The RCC administrative staff oversaw the data entry of personnel documents by the DO's.

Approximately 500,000 jobs were available for the 1990 census. DO's were instructed to recruit four applicants for every job. This figure was based on (1) the belief that 20 percent of the applicants would score very low on the various selection tests and (2) the expected high (over 40 percent) turnover rate.

Overall, the recruiting effort went very well. There were areas of the country that had spot shortages of employees, especially some cities where the cost of living was high and the unemployment figures were low. The Bureau made upward adjustments to its pay scale for these areas during the census to encourage applicants to apply. This was a significant improvement that was critical to the recruitment success in many areas. (See pay chart on p. 23.) The DO testing clerks sent everyone interested a Reply to Employment Inquiry, Form D-264, which listed the qualifications for census work, stated what identification documentation was needed, and gave the location and date of the next test.

Recruiters set up employment booths at local shopping centers and other places where sufficient pedestrian traffic was present to generate ample responses. Postcards, titled Census Workers Needed, Form D-265, were mailed to all occupants in target areas for DO's that had trouble recruiting qualified job candidates. Local civic groups, clubs, and job centers were all prime targets of the census recruitment effort.

## Qualifications

Every job applicant had to take a written test and a structured oral or telephone interview and meet certain other requirements before being hired as a census worker. Persons interested in applying for census positions completed an application Form BC-170, Census Employment Inquiry, which obtained information on the applicant's qualifications and suitability for employment. It was advertised that crew leader and enumerator jobs required working some evenings and weekends to find people at home. Qualifications for census work were as follows:

1. Applicants were required to take a written test to show abilities to read, follow written instructions, etc. There was an additional test for data transcribers.
2. Applicants had to be physically fit for the job. Enumerators had to be able to travel distances by using their car or public transportation, climb stairs, read small print on census forms, and have the ability to speak and hear normal conversation.

3. An applicant generally had to be 18 years old, although persons age 16 or 17 could be hired if they met conditions of employment set by State or local laws and were either high school graduates or had equivalent education or work experience. There were no education requirements for persons 18 years old and over.
4. All applicants were expected to be available to work at least 30 to 40 hours a week, but persons who could work 20 hours were still encouraged to apply. Note: All potential applicants were encouraged to apply.
5. Persons were expected to have a satisfactory work record for the past 5 years. Poor job performance, dishonesty, criminal or immoral conduct, or unreliability could be a basis for nonselection.
6. Conviction of a violation of the law since age 18 for something other than a minor traffic violation could be a basis for nonselection.
7. A person could not engage in any partisan political activity during any 24-hour period in which census work was performed.
8. Anyone barred from a civil service examination could not be considered for employment.
9. An applicant for crew leader or enumerator positions could not be employed as a tax assessor, tax collector, or law enforcement officer.
10. Applicants without a Social Security number were not eligible to be hired.
11. All males born after December 31, 1959, and age 18 or older had to be registered with the Selective Service System. Applicants not registered by age 26 could not be hired.
12. All applicants were required to present documentation of employment eligibility. Applicants could be asked to produce a police record, driver's license, social security card, or other forms of documentation, if needed.
13. All applicants claiming veterans' preference were required to bring a DD-214, Service Record, or equivalent to the testing site.
14. All applicants were required to take an oath of office; those who refused to do so were not hired.

## The Applicant File

When persons applied for census jobs, the information was maintained in a computerized applicant file (AF). This file was part of the DO computer system and was used to keep a record of all applicants who had taken the employment test and completed Form BC-170, Census Employment Inquiry. The DO office staff transcribed information

from this form and the Applicant Background Questionnaire (Form BC-1431) for input into the AF. Information was stored for persons testing for crew leader, enumerator, data transcriber, supervisory data transcriber, office clerk, and supervisory office clerk positions. Applicant information was sorted by census geography (except for office positions), so when job selections were made, a listing (Form D-425, Employee Selection Record) could be computer-generated for a specific area. Since enumerators were assigned to work areas in which they resided, this geographic sort simplified their selection. The AF also could produce a list of applicants who spoke certain languages or could only work weekends or evenings. Each person in this file was assigned a code that reflected his/her status. For example, code "A" meant that the person was available, code "E" meant that the person had previous census experience but was not currently working, code "T" (terminated) meant that the employee had been released and should not be rehired.

The applicant file was the source of a variety of administrative statistics on recruiting. Reports were generated daily for recruiting statistics and background profiles by race, sex, county, ARA, and DO.

### **Selection Procedures**

The primary selection aid used for the 1990 census was the written test. Candidates seeking RCC positions were administered Form D-270A/B, Field Employee Selection Aid for Supervisors. Administrative supervisors and specialists, area managers, and regional technicians took this test (except headquarters staff and permanent employees in the regions who filled some of these slots). Candidates for DO positions including DOM, ROS, AMFO, AMA, AMEDP, AMOO, SPOS, OOS, and FOS were also required to take this test. The skills measured by this test were assumed to be transferable to these positions.

The ROS supervised a staff of SOC's who conducted the testing sessions in the DO for applicants for DO lower-level supervisory and nonsupervisory intermittent positions, such as enumerator, crew leader, data transcriber, and SOC. Candidates for these positions were administered Form D-267A/B, Field Employee Selection Aid, which had been revised from 54 questions (for the 1980 census) to 28 questions in 1987. This test, which took about half an hour to complete, consisted of five parts that measured the applicant's ability to read, do clerical work, compute arithmetical problems, interpret information and evaluate alternatives, and organize information. Data transcribers also took an automated typing test that took about 15 minutes. They had to demonstrate proficiency of at least 7,440 keystrokes per hour. Certification by a college administering a data transcriber test could be used in lieu of the automated typing test. If the DO had a problem in recruiting data transcribers, the DOM had the option of lowering the per-hour keystroke standard.

There was a Spanish version of the Field Employee Selection Aid for use in areas where there were large concentrations of Hispanics or where the regional director

had determined the Hispanic affirmative-action hiring goals might not be met. Area managers informed the DO's when it was necessary to use the Spanish version. Applicants who passed this version of the written test still had to take a supplemental test to demonstrate English-language proficiency.

A second screening-form selection aid, collected from all applicants at the time of testing, was the application form. When candidates for jobs as nonsupervisory employees, crew leaders, and SOC's arrived for testing, a clerk gave them folders containing Form BC-170, Census Employment Inquiry, which asked questions about education, language skills, availability, and previous work experience. They were shown a map and asked to enter the closest intersecting streets to their homes on the form; these street intersections were geocoded and keyed with other information, so the applicant file could identify applicants for local assignments. Applicants also completed Form BC-1431, Applicant Background Questionnaire (voluntary form), on which they were asked to indicate which race and/or national origin best described them and to disclose any medical disability/handicap that would cause difficulty in relation to job requirements. The form BC-1431 did not contain any personal identifiers, and it was destroyed as soon as the data had been captured; thus selecting officials never knew the race/origin or the handicap status of any applicant. Data gathered from these forms were used to compile information about census applicants at the time of testing. The application form for supervisory candidates was the Personal Qualifications Statement, SF-171, (the standard application for all Federal jobs); it covered most of the topics described above in relation to the BC-170.

The third screening form was the structured-interview guide, form D-269. Separate guides were developed for the following positions: Crew leader, enumerator, office clerk, data transcriber, and stock and supply assistant. There also was an interview guide for SOC's and supervisory data transcribers. Prospective clerks, enumerators, crew leaders, and SOC's could be interviewed by telephone; others had to be interviewed in person.

The fourth screening form was the employment reference check, form D-296, which was intended to ask an applicant's previous employer certain questions about the applicant's dependability in attendance and job performance. It was used only for candidates who had taken the written test, been cleared by the Federal Bureau of Investigation (FBI) criminal history check of their background information, met all qualifications on the job application, satisfactorily completed the oral interview, and were under serious consideration for employment.

**Test administration and security**—Nonsupervisory tests were administered by testing clerks supervised by the AMA and ROS. Supervisory tests were usually administered by RCC personnel. Each DO had a testing room, and satellite testing sites were established throughout the DO area in donated space as the need for additional capacity or



proximity to candidates arose. Testing began right after the AMA and ROS and their staffs were hired, and generally continued until the pool of active workers and applicants on file was considered large enough to meet future hiring needs. Several test sessions were held at each site each day, usually at 2-hour intervals to allow enough time to give instructions, answer questions, and collect materials.

All testing materials were kept in a secure location at all times to prevent unauthorized circulation of tests and for confidentiality purposes. To prevent cheating during the nonsupervisory test, there were two versions (A and B), identical except for different arrangement of items, so that persons sitting side by side had different versions of the test.

There was no passing score on the nonsupervisory test for enumerator or clerical positions, although applicants had to answer at least 10 questions correctly to be considered (unless the RD authorized a lower number). Applicants had to attain a minimum score of 15 out of 28 to be considered for crew leader or SOC. RD's could lower the minimum score if they thought the qualified applicant pool for any DO was insufficient.

After the tests were scored, applicants were sent postcards (Census Job Applicant Card, Form D-286) informing them that their applications and tests were being reviewed and were on file.

Approximately 2 million job candidates took the nonsupervisory test.

**Selection**—Supervisory employees (those who took the supervisory test, but not lower-level supervisors such as crew leaders and SOC's) were hired by RCC personnel. Selections were to be based on a written test, experience, the oral interview, and the reference check, not solely on test score rank. Veterans having service-connected disabilities of 10 percent or more were considered first,<sup>8</sup> along with political referrals. All DO employees were supposed to be residents of the DO area, although some DO's staffed field positions with employees that did not meet this criterion. Affirmative action guidelines were to be applied so that the DO staff, at all levels, was representative of the local labor force profile.

Nonsupervisory employees were hired by the DO supervisors. With the exception of hiring management personnel, employee selection was the responsibility of the AMA. All hiring of nonsupervisory personnel occurred directly out of the DO and was referred to as "centralized selection." The FOS chose crew leaders and enumerators in some DO's, but only with the direct approval of the RCC. The OOS hired SOC's and clerks, except for the few that worked under the other supervisors in the DO.

By far, the largest number of positions available during the census were for enumerators. In most cases, potential enumerators were interviewed and hired by selection

clerks who were under the direct supervision of the SOC. The SOC or other supervising official reviewed the results of the interviews, the applications, reference checks, and test results to determine who should be hired. The AMFO and AMA requested a specific number of enumerators and identified any special requirements, such as weekend or evening work or language skills, on Form D-150, Applicant File Employee Selection Record/ Correction Request. The SOC forwarded this to the AMEDP to produce the appropriate selection record by employee type by county, crew leader district (CLD), and/ or address register area (ARA). EDP personnel generated a computerized list of available personnel, Form D-425, Employee Selection Record. Under the guidance of the SOC, selection clerks interviewed some or all of the applicants on the selection record before deciding which person(s) to recommend for a job. Selection clerks began interviewing candidates at the top of the selection record; however, any person listed could be hired, using veteran preference guidelines as first priority.

In all, over 550,000 employees were hired for the 1990 census, compared with about 460,000 for the 1980 census, reflecting about a 19.7-percent increase. About 300,000 employees worked during the peak activities, with about 1,800 more in the RCC's. There was an increase in the total employment statistics over 1980 for all RCC's except in Detroit, Chicago, and Denver. Approximately 3.6 percent of all the selectees were Federal and military retirees. The work force's racial and ethnic composition varied according to local conditions and the need for staff in particular areas. The Bureau experienced a 5.5-percent increase in the hiring of minority employees for the 1990 census. Table 4 shows the national racial/ ethnic composition of the field work force.

**Table 4. National Racial/ Ethnic Composition of the Field Work Force**

(Represents only field employees)

| Race                          | Field work force | Percent of field work force | Percent in 1980 civilian labor force |
|-------------------------------|------------------|-----------------------------|--------------------------------------|
| Overall totals .....          | 551,200          | 100.0                       | 100.0                                |
| Minority totals .....         | 180,890          | 32.8                        | 17.9                                 |
| Black .....                   | 108,404          | 19.7                        | 10.0                                 |
| Hispanic* .....               | 51,937           | 9.4                         | 5.7                                  |
| Asian/ Pacific Islander ..... | 11,418           | 2.1                         | 1.7                                  |
| American Indian .....         | 9,131            | 1.6                         | 0.5                                  |
| White .....                   | 370,310          | 67.2                        | 82.0                                 |

\*Can be of any race.

Note: Numbers provided in this table do not include 1,325 DO employees from the Chicago RCC.

Source: District Office Minority Employment Report—1990 Decennial Census, February 21, 1991.

## Appointing and Releasing Employees

Before an individual could work for the Census Bureau, he or she first had to be "appointed" to a specific position. The appointment process consisted of new employees

<sup>8</sup>The selection procedures also considered other veterans eligible for 5- and 0-point preferences, depending on length of service, service in a theater of war, and other factors. For further information, refer to the *Regional Administrative Manual*, Form D-520.

completing personnel forms and taking the "oath of office."<sup>9</sup> RCC personnel appointed all DO managers and assistants, while direct supervisors (or other designated officials) generally appointed the persons who reported to them. The process was very important, since this was the time that all personnel papers (including payroll and tax information) were completed and reviewed, and confidentiality rules for the census were explained. The appointment folder, given to each person, contained the following documents:

**BC-112, Notice of Restrictions on the Political Activity of Employees**—The appointee read and kept this form. The Hatch Political Activity Act generally limited Federal employees (including census workers) to nonpartisan participation.

**BC-50A, Notice of Short-Term Employment**—This form was used only for intermittent DO employees hired for the census. The appointee was asked to read the Privacy Act Notice on the back of this form, which stated the Bureau's authority for, and purpose in, collecting the personal information he or she provided.

**SF-181, Race and National Origin Identification**—The employee completed this form by self-identifying his or her race and/or national origin. The Bureau used this information to compile hiring statistics for minorities.

**SF-256, Self-Identification of Reportable Handicap**—The employee completed this form, declaring a handicap, if any. The Bureau used the information to measure and report on its progress in hiring and placing handicapped persons.

After the appointees completed these forms and the supervisor reviewed them for completeness, the appointing official administered the oath of office. After appointees took the oath, they acknowledged this and the affidavits that followed by signing their BC-50A (Notice of Short-Term Employment) and received a copy of the completed document. The appointment folder was turned in for administrative processing.

**Oath of office and appointment affidavits**—Before swearing to or affirming these appointment affidavits, appointees were asked to read and understand them.

I do solemnly swear (or affirm) that—

**1. OATH OF OFFICE**—*I will support and defend the Constitution of the United States against all enemies, foreign and domestic; that I will bear true faith and allegiance to the same; that I take this obligation freely without mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties of the office on which I am about to enter, SO HELP ME GOD.* (Note: employees could refrain from making any reference to GOD.)

**2. AFFIDAVIT AS TO STRIKING AGAINST THE FEDERAL GOVERNMENT**—*I am not participating in any strike against the Government of the United States or any agency thereof, and I will not so participate while an employee of the Government of the United States or any agency thereof.*

**3. AFFIDAVIT AS TO PURCHASE AND SALE OF OFFICE**—*I have not, nor has anyone acting in my behalf, given, transferred, promised or paid any consideration for or in expectation or hope of receiving assistance in securing this appointment.*

**4. AFFIDAVIT OF NONDISCLOSURE**—*I will not disclose any information contained in the schedules [questionnaires], lists, or statements obtained for or prepared by the Bureau of the Census, to any person or persons either during or after employment.*

Whenever an employee was moved from one census position to another, and the move involved a change in pay rate and title, a new BC-50A form had to be completed and processed. Employees normally were released when they completed their assignments, or before if their performance was unacceptable. In these cases, the supervisor and the employee completed and signed a final payroll form and completed a separation form BC-50A, and the employee was provided with a SF-8, Notice to Federal Employee About Unemployment Insurance.

## Payroll and Reporting Procedures

Paying decennial field employees involved separate payroll operations for four distinct groups of personnel: Career Census Bureau employees from headquarters who had been detailed full-time to work as area managers, supervisors, support staff, or regional technicians; other RCC and DO full-time personnel; RCC intermittent employees; and DO intermittent workers. The payroll goal for the RCC's and the DO's was to pay at least 95 percent of all employees fully each pay period with a Treasury check sent to each one who worked.

Personnel from headquarters were paid through the National Finance Center; payroll for all others was handled by the RCC's and the DO's. Employees from headquarters generally received the same pay due them in their regular Census Bureau jobs (which might or might not have had anything to do with the decennial census); however, some were given salary adjustments (for accepting assignments in hard-to-enumerate areas) or temporary promotions in census positions. In addition, they could claim a percentage (based on length of detail) of the allowable per diem based on the particular location they were assigned and receive reimbursement for other specified expenses. Except when detailed for more than a few days, they established residences within commuting distances of their field work. When their temporary assignments were completed in the field, these people were reassigned to their original (or comparable) jobs.

RCC full-time personnel included the ARCM, area managers, regional technicians, geographic and other specialists, technicians, and some clerks. The DO full-time employees included the DOM, administrative assistant, AMA, ROS, AMFO, AMEDP, and AMOO. Since full-time employees were appointed to regular tours of duty or terms longer

<sup>9</sup>Printed on the back of the BC-50A.



than 90 days, they earned annual and sick leave. Payrolls for these employees were processed every 2 weeks by the RO using the Field Automated Payroll System (FAPS).

DO intermittent employees, by far the largest group, included enumerators, crew leaders, FOS's, SOC's, and office clerks; these employees did not have regularly scheduled tours of duty and did not earn annual or sick leave. Many intermittent employees switched from one position to another; for example, a person may have been an enumerator during one operation and perhaps a crew leader for the next. When employees changed positions, they were converted to new positions to reflect the change in position pay rates. This applied not only to DO intermittent employees but also to RCC intermittent and full-time employees.

Payrolls for intermittent employees were keyed daily in the DO, and a tape was submitted to the RCC at the end of the weekly pay period. All intermittent employees used Form D-308, Daily Pay and Work Record,<sup>10</sup> to record their hours, mileage, and expenses. In 1980, only DO intermittent workers in centralized offices were paid weekly, but in 1990, all DO intermittent workers were paid weekly in an effort to maintain morale and reduce turnover.

The Decennial Automated Payroll System (DAPS) was used to pay all DO intermittent employees. Operation codes were established for all DO's. Major operations had specific codes for various steps of the operation, and only specified types of employees could charge costs to certain codes. For most operations, DO employees also entered their production hours under the operation code used for training. This system was a valuable management tool to account for costs and production by RCC, DO, and operation, although payrolls frequently contained the incorrect operation codes, which misallocated cost to various operations.

Typically, enumerators completed a Daily Pay and Work Record by entering their time, mileage, production, and expenses under a specific operation code for each task performed during the day worked. Then the enumerator returned form D-308 to his or her crew leader, who reviewed the form and signed it, confirming that all the entries were legible and correct. The crew leader then delivered the Daily Pay and Work Records to the FOS, who submitted them to the DO. The SOC for payroll was responsible for auditing and verifying the payroll forms which were then keyed. Once the data capture and reconciliation of keying discrepancies had been completed, the AMA created payroll tape cartridges containing hours and expense data for intermittent positions and forwarded them to the RCC for payment calculations. Employees covered under the DAPS for 1990 received over \$707 million in total earnings and over \$94 million in reimbursable expenses.

The RCC's processed all DO payroll tapes. A 100-percent quality control audit was performed for all newly opened DO's first and second pay periods. Any problems

were reconciled with the DO's involved, although RCC staffs audited charges for overtime, per diem expenses, supplemental payments, and other special situations. If no problems were detected, RCC's transmitted the data over special dedicated computer lines to headquarters for processing, verification, and review. Headquarters reviewed and processed the payroll data and sent rejected information back to the RCC. After all the differences between headquarters and the RCC's had been reconciled and verified as correct, headquarters calculated the pay. The RCC created a Treasury tape and prepared vouchers for payment by the U.S. Treasury Department, which mailed checks directly to the employees' homes. The RCC's printed and mailed the intermittent employees' earnings statements. DPD was responsible for receiving and mailing over 500,000 W-2's (wage and earnings tax statements) during January 1991.

Decennial pay rates for DO employees were raised before the start of the census, following recruiting problems experienced in many parts of the country during the 1988 dress rehearsal and the national prelist operation. The overall scheme for 1990 pay rates included seven levels of pay. The method used to determine pay rates for a particular DO was based on hard-to-enumerate criteria, recruiting difficulties, and competitive local wage rates. Pay rate ranges for selected DO positions are shown in table 5. Pay rates for rural areas tended to be in the low range, whereas pay rates for large metropolitan hard-to-enumerate areas/ upper wage scale areas, Hawaii, and Alaska were at the high end.

Pay rates were again revised effective June 3, 1990, for enumerator, crew leader, FOS, and selected management positions in certain DO's where shortages of field enumeration staff existed and recruiting enough qualified personnel was a problem. These revised pay rates were geographically concentrated in the New York, Los Angeles, San Francisco, and Atlanta RCC areas.

**Supplemental pay**—In addition to hourly wages, enumerators, crew leaders, and FOS's could earn additional monies for quality performance during list/enumerate (L/E) and the nonresponse followup (NRFU) operations (see pp. 32 and 34). A supplemental pay program was administered throughout the United States, including Alaska and Hawaii, as an incentive to motivate and retain workers and to stimulate production and quality. The amount of supplemental pay was based upon the total number of cases (questionnaires) completed during the above-listed operations. Enumerators were paid between \$50.00 and \$100.00 after satisfactorily completing training and 50 cases, depending upon the pay level established for that area. Enumerators had to meet certain quality and time restrictions to be eligible. Following a cumulative scale, enumerators, crew leaders, and FOS's could earn more money by completing additional cases if they met quality and production goals.

The Census Bureau was experiencing turnover and staff shortages and needed an even greater incentive to retain

<sup>10</sup>A facsimile is included in app. 6D.

**Table 5. Hourly Salary Rate Ranges for District Office Personnel**

| Position                                 | Wage range (hour) |
|--|-------------------|
| District office manager*                 | \$12.50 to 18.00  |
| Assistant manager for field operations*  | \$9.50 to 14.50   |
| Assistant manager for administration*    | \$7.50 to 12.00   |
| Assistant manager for office operations* | \$7.50 to 12.00   |
| Assistant manager for EDP*               | \$7.50 to 12.00   |
| Recruiting operations supervisor*        | \$7.50 to 12.00   |
| EDP operations supervisor                | \$7.00 to 10.00   |
| Field operations supervisor              | \$7.00 to 12.00   |
| Special place operations supervisor      | \$7.00 to 10.00   |
| Office operations supervisor             | \$7.00 to 10.00   |
| Crew leader                              | \$6.00 to 11.00   |
| Supervisory data transcriber             | \$5.25 to 7.75    |
| Supervisory office clerk                 | \$5.25 to 7.75    |
| Administrative assistant*                | \$5.25 to 7.75    |
| Enumerator                               | \$5.00 to 10.00   |
| Data transcriber                         | \$5.00 to 7.50    |
| Stock and supply assistant               | \$4.50 to 7.00    |
| Clerk                                    | \$4.50 to 7.00    |

\* Mixed-tour full-time employees, paid biweekly.

remaining employees. To remedy this situation, it extended the supplemental award payment program to encourage employees to remain. In addition to this extension, a piece-rate plan implemented on June 3, 1990, paid enumerators \$1.50, crew leaders \$0.20, and FOS's \$0.05 for each completed case in addition to their regular hourly rates. This plan allowed DOM's to retain and motivate their employees to work a few additional weeks past their respective completion dates.

Enumerators were paid the minimum hourly wage (\$3.80) for the duration of their training for all operations that offered a supplemental first review (training) payment. All other operations paid the prevailing wage rate for training. Enumerators were paid \$0.24 for each mile driven on official business. Mileage was generally paid to DO office staff who had to drive their cars for official business. Employees also were reimbursed for toll fees, bus fares, parking fees, official telephone calls, and similar expenses incurred while carrying out their duties.

## TRAINING

### Introduction

The Bureau's training program for field personnel followed a basic pattern established in previous censuses. The instruction was standardized and presented verbatim so that the results would be uniform nationwide, varying only by type of enumeration. Some data-collection procedures were common to all offices while some were unique to specific office types. The latter duties were presented through the use of verbatim training guides written for each type of DO. Training guides, manuals, and self studies were color coded by type of office and specialization: type

1 manuals and training materials had brown covers, type 2 manuals and training materials had salmon covers, and type 3 manuals and training materials had green covers. The color coding of manuals was beneficial for offices that had dual procedures for some operations. For the 1990 census, Field Division put more emphasis on specialized training packages for field staff positions than it had for 1980.

A "pyramid" system was established, so that each employee other than an enumerator or clerk, after training (that included "How to Train" information) and a few days or weeks of experience on the job, became the trainer of the people he or she supervised. For example, AMFO's trained their FOS's, FOS's trained their crew leaders, and crew leaders trained their enumerators. The trainers at each level used the "Instruction to the Trainer" module located in each verbatim training guide. This module provided information on the use of training materials and videocassette equipment, how to obtain training space, and classroom training techniques. Instructor and trainee kit contents were listed in the beginning of each training guide so the instructors could check these kits for completeness. Most major operations required enumerator and crew leader training sessions throughout the operation to replace employees that either resigned or were released.

For the 1990 census, there was more reliance on the use of "self-studies," which trainees had to complete prior to the training session. It was presumed that they would derive more out of the classroom session if they understood some of the basics from the start. These self-studies provided operational background and some information about the topic, and then asked some basic questions regarding the presented material. Trainees were allowed to claim from 1 to 2 hours of training time for completing the self-study at home.

Another technological change from the 1980 census involved the use of videocassette equipment. For the 1980 census, filmstrips conveyed training information, but for 1990 almost all training sessions had one or more videocassette presentations. Some of the topics covered were census overviews, confidentiality, interview techniques, and information on the homeless in America. Every DO could rent a VCR and a monitor. If additional video equipment was needed, instructors were asked to bring their own or arrange for its rental. These video presentations were the only aids of this sort used in the DO; they were favorably received but generally considered to reflect ideal rather than actual situations.

There was more reliance upon on-the-job training (OJT) techniques than ever before. During some enumerator training sessions, trainees were required to go into the field to check addresses, spot locations on census maps, and complete short-form questionnaires. They were asked to review and discuss their experiences during the next training session. This mix of class time and real-life experience provided enumerators with a good base of knowledge to perform their jobs. At the completion of most field operations training sessions, crew leaders were required to

select at least four trainees to receive OJT based on their classroom performance. The crew leaders accompanied each of these enumerators individually to the field, reviewed their work habits and knowledge, and provided immediate feedback to them on the spot.

Because map reading, updating maps, locating living quarters, map spotting, and listing addresses were important skills for almost all field employees, there was a geographic map simulation training package developed by the Census Bureau titled "Abbotsville." Abbotsville incorporated the above aspects of the enumerator's job into a verbatim training script that was used during the prelist, prec canvass, list/ enumerate, and update/ leave training sessions. A unique feature of this package was that the training was divided into two sections; one dealt with rural areas and the other section covered urban map skills, so the training could be used for different types of enumeration. Simulated address register area (ARA—see p. 34) maps and text exercises were different for each package.

The Field Division at Bureau headquarters had its own procedures and training unit, staffed by training specialists, operational experts, and technicians who planned, designed, and developed the manuals, verbatim training guides, workbooks, job aids, and self-studies used for the 1990 census. Various divisions at headquarters, including DPLD, STSD, GEO, and POP provided operational specifications to the procedures writers and assisted in reviewing all training materials. Varying from past censuses, Field Division incorporated procedures-writing and training functions into one branch, although other branches wrote materials for management training for DOM's and various RCC staff and EDP functions.

During the census, a number of revisions to procedures and training packages were implemented and transmitted to the field. These revisions were sent out over the automated mail utility system to the RCC for further dissemination to the DO's.

### **Managerial Training**

In general, each RCC staff trained its regional technicians and DOM's. Training for area managers was an informal session conducted in various RCC's by headquarters staff. These area managers were prepared to act as liaisons between the RCC's and the DO's by learning their job duties and being given an overall picture of the census. After training, they trained DOM's and their administrative staff, using verbatim training guides and a "team" training program. Three major DO management training sessions covered various topics, including computer-based training on the applicant file, time management, decision making, budget (automated authorization), office layout, recruiting and appointment, and operational procedures. Video-based training included information on the history of the census, census geography, and generic management topics such as team building. Modular training had handbooks, job aids, EEO and media workshops, and a 12-hour problem-solving workshop. Using area

managers to train allowed positive reinforcement, and training DO administrative staff together with the DOM's provided a broad knowledge base in the DO that proved invaluable during the census. MDO staffs were sent to Columbia, MO, for training at a working DO with actual "hands-on" experience. These experienced MDO personnel later assisted the new BDO office staffs.

The AMEDP and DOM received additional classroom training on computer hardware and software. The vendors' representatives taught computer equipment operation and maintenance and the RCC automation technician explained how to run census software. There also was a "trouble desk" located at headquarters, where AMEDP's or RCC automation technicians could report various software problems and receive timely advice.

### **Office Training**

The assistant manager for administration (AMA) trained the supervisory office clerks (SOC's) responsible for administrative functions such as testing and selecting, and the administrative SOC trained all administrative clerks.

The assistant manager for office operations (AMOO) trained the SOC's on the various aspects of office operations, as well as the office operations supervisor (OOS), who was only utilized during peak operations such as questionnaire check-in and assistance. The SOC's, in turn, trained their clerical staffs using OJT and job aids. There were some verbatim guides for training clerks for major operations such as edit and telephone followup. There was greater emphasis in 1990 than in 1980 on informing office operations and administrative personnel about how their jobs fit into the overall flow of census work.

### **Field Training**

The assistant manager for field operations (AMFO) trained the field operations supervisors (FOS's) at various central locations for major operations, using verbatim guides tailored for large operations; in turn, the FOS's trained the crew leaders, who instructed the enumerators at various training locations in the DO area. These classrooms were located in local libraries, schools, churches, civic centers, etc., in their respective crew leader districts. As much of the training material as possible was incorporated into the verbatim guides, including exercises, tests, answer keys, and other teaching devices, while all trainees had manuals and other references in their training kits. There were logistical problems encountered—having the training materials available on time, in sufficient quantities, and in complete sets; distributing them; and seeing that everyone received updated sheets and missing items. Most DO's had problems with turnover that necessitated the scheduling of additional training sessions, which at times overburdened training staffs and drained training supplies.

Training times for enumerators averaged from 1/2 to 4-1/2 days, depending upon the operation. Crew leaders usually required one more day, for supervisory training.

Trainees were given two 15-minute breaks during the day and were allowed an hour for lunch.

Overall, the RD's, AM's, and DOM's thought training was very effective and the trainees' reactions to the various kinds of training were favorable. Although every effort was made to structure training to simulate real situations, some trainees felt that it tended to assume ideal conditions and did not fully prepare them for emergencies or hard-to-enumerate situations.

## MAIL CENSUS

### Introduction

The mailout/mailback method was used to enumerate about 207.4 million persons in about 86.2 million housing units (not including U/L) located in cities, towns, suburban areas, selected rural areas, and small towns in rural areas where mailing addresses consisted mainly of house numbers and street names or other addresses that permitted letter carriers to deliver questionnaires to specific housing units. For this type of enumeration, the Census Bureau developed a master address list (see ch. 4), sent preaddressed questionnaires to housing units through the mail, and requested the occupants to complete the questionnaire and return it by mail. The Bureau had two ways of obtaining addresses: One method involved purchasing addresses from a commercial vendor for areas where the Bureau could geocode<sup>11</sup> the addresses by computer or manually in the DO's, and the other method was to send enumerators door-to-door to create the geographically coded list. (Refer to ch. 4 for detailed information about precavass, 1988 prelist/1989 prelist, and other pre-Census Day operations.)

The Bureau compiled and updated the geocoded address file by checking and adding addresses to the vendor mailing list through the precavass operation and a review by local letter carriers. This list was called the TAR (tape address register).<sup>12</sup> It also created its own list for its 1988 prelist areas, which was updated by the letter carriers. The Bureau then compiled an address control file (ACF) from these geocoded lists. A census questionnaire was mailed to every address on file. Each questionnaire had a unique bar code (similar to the ones on consumer products in retail stores) that linked the basic geographic codes with the individual record in the ACF. This questionnaire identification (ID) on the mail returns contained a four-digit DO number followed by a seven-digit questionnaire identification number. Each questionnaire also had a geographic number that contained a four-digit ARA code, a three-digit

block code, and a four-digit (map spot) number that was used with a census map to identify the location of the living quarters in prelist areas. The map spot number was not used for TAR ARA's (numbered 4001-5999) areas. The smaller bar code located on the lower right of the questionnaire was called the POSTNET bar code. This bar code allowed the USPS to automatically sort the mailing pieces to the nine-digit ZIP Code destination and provided an automated method of determining the number of mailing pieces processed. This bar code was computer printed on the questionnaire (see fig. 4) as part of the addressing operation, and it showed through a window at the bottom right of the return envelope. (For more detailed information on the questionnaire, refer to chs. 4 and 7.)

Once all the DO's were opened, the initial efforts were directed at equipment receipts and supplies, maps, publicity, recruiting, and other preliminary activities—all with their attendant difficulties to be surmounted—as noted at the beginning of this chapter. This was followed by hiring, training, and assigning personnel to begin work on the pre-Census Day (April 1) operations (see ch. 4). These activities were aimed at enhancing the master address list to ensure that every possible housing unit in mailout areas received a census questionnaire in the mail.

The first operation to take place after all the DO's were open was the "yellow card" field coding in which DO's with TAR areas had to geocode each yellow card (form D-374) received. Each card represented an address that the computer was not able to geocode and was not added during precavass, or to which the precavass operation had assigned more than one geocode.

The Geography (GEO) Division produced a national ZIP Code file that contained ZIP/DO relationships. DOD sorted the uncoded yellow cards by ZIP Code and used this file to distribute them to the DO's. Because DO boundaries and ZIP Code delineations did not match, DOD sent the yellow cards to the primary DO designated for the specific ZIP Code. DO's sorted their cards and transferred cards that belonged to neighboring DO's.

During yellow card field coding, DO clerks first attempted to geocode the card in the office, but if it could not be coded, enumerators tried to locate the address on the ground by comparing its location to a large-scale census map; then they assigned it the correct census geography. The workload for yellow card field coding was approximately 3.08 million cards.

Another important operation that took place a few weeks before Census Day (April 1) in both TAR and 1988 prelist areas was the casing check, in which the Postal Service determined if the Bureau had one address card for each address in the postal carrier's route. Postal carriers "cased" (i.e., put in their delivery route order) the address cards and then completed information on a form called a blue card (Form D-722, Post Office Report of Missing Address) for each residential address (in the case) that was not represented with an address card. The blue card provided address information, and for addresses for which there was no house number/street name (for example, a

<sup>11</sup>The process of assigning a code that identified a general location of a housing unit, special place, or group quarters (see pp. 48-49). The geocode consisted of the district office code, ARA number, block number, and, in non-TAR areas, a map spot number.

<sup>12</sup>TAR's covered areas for which the Bureau had purchased, and computer-assigned geographic codes to, an address file for use in the mailout. The precavass operation (ch. 4) verified and updated the content of the address list prior to the "yellow card" operation.

Figure 4. Example of the Census Bar Code on Front of the Mailout Questionnaire

- This is your official census questionnaire
- Please fill it out and mail it back by Census Day, April 1, 1990

- Need help — See the enclosed instruction guide or call 1-(800)-000-0000



Make sure that before you seal the envelope the address of the U.S. Census Office shows through the window.

GEO: 2336 1006 101 0063  
\*\*\*\*\* CAR-RT SORT\*\* CROO  
00675-002  
JOHN DOE  
HCR 1 BOX 963  
TESTTAPE US 00000



U.S. BUREAU OF THE CENSUS  
DISTRICT OFFICE 3058  
JACKSON, MS 00273-0233

3R-000-008760

If wrong apartment identification, please write the correct number or location above.



rural route/box number), the geocode of the nearest deliverable address, usually on the same side of the street. The postal carriers also corrected addresses and provided information about duplicates and undeliverable addresses. The DO staff picked up the blue cards from the local post office and tried to geocode them in the office (except in prelist areas, where all cards, except obvious duplicates, had to go out for field check and map spotting). There were approximately 3.8 million blue card addresses. All legitimate blue card residential addresses were added to the master address list; addresses that made the list in time received questionnaires during the census mailout prior to Census Day. Addresses that did not make the cutoff had to be addressed and mailed from the DO, and some went to nonresponse followup.

Approximately 1 week prior to Census Day, questionnaires were mailed to housing units throughout the United States. In some areas of the country, questionnaires were mailed earlier, but the overall numbers were small and the net effect on operations was minimal. There were reports that some postal stations did not receive their shipments of questionnaires or received partial shipments, while other post offices reported that some questionnaires could not be delivered as addressed, although the vast majority of questionnaires were delivered between March 23 and March 27. There were several reports of concentrations of questionnaires that the USPS did not deliver because the Bureau had used street-name/house-number addresses in areas that were predominately postal box address areas. Postmaster returns (PMR's) were sent to the Jeffersonville, IN, PO, but because of the large volume of PMR's, the Bureau decided to sort and return these to each respective DO. DO staffs attempted to hand-deliver these errant questionnaires. Overall, the total number of

undeliverable questionnaires was about 4.8 million, of which 1.8 million were eventually delivered by DO staffs.

All DO's (except two type 3 offices) had mailout/mailback areas located within their jurisdictions. Mail returns for type 1 DO's were returned addressed to the appropriate processing office rather than the DO. Mail returns for type 2 and 3 DO's were returned directly to the local DO. Mail-return questionnaire check-in, edit, and telephone followup operations took place at the DO for type 2 and 3 DO's and in the processing office for type 1 DO's. (See p. 27 for discussion.)

### Questionnaire Assistance

The 1990 census had two types of questionnaire assistance—telephone assistance and walk-in assistance centers. Telephone assistance was provided in type 2, 2A, and 3 DO's. Type 1 DO's had walk-in centers; they did not have phone lines or numbers available for telephone assistance, since this was done from the PO's. Callers were routed to the servicing PO based on the caller's originating area code and exchange.

Telephone and walk-in assistance was available in English as well as Cambodian, Chinese, Korean, Laotian, Spanish, Thai, and Vietnamese where appropriate. Six of the seven PO's provided English and Spanish telephone assistance for type 1 DO's; the San Diego PO also offered telephone assistance for the six Asian languages. The Kansas City PO was the only one that did not have questionnaire assistance for type 1 DO's, because there were no type 1 DO's within its area of responsibility. The volume of calls to the toll-free telephone assistance numbers significantly exceeded all expectations; in particular,



the number of requests for Spanish-language questionnaires was much higher than anticipated. PO's added 511 clerks for approximately 900 phone lines, and type 2, 2A, and 3 DO's had extra telephone lines and staff for questionnaire assistance operations inside their offices. Telephone questionnaire assistance for type 2 and 3 DO's was only in English. All DO's had walk-in questionnaire assistance on site, that is, at the DO itself. Phone bills for the PO's and the DO's for questionnaire assistance were approximately \$4.7 million, with an additional \$2.4 million spent for PO staffing.

Promotional materials, mailed prior to the questionnaires, informed the public about the various kinds of questionnaire assistance available. Two of the more important promotional items were the Early Alert Multilingual Mailout (EAMM) and the Language Assistance Guide (LAG). The EAMM flyer listed language assistance phone numbers in six Asian languages and was mailed to households in selected ZIP Code areas. The LAG was designed to be respondent-friendly, and it could be "lined up" with the questionnaire so respondents could follow and complete their form. The LAG was distributed through national and community-based organizations directly and was carried by enumerators.

**Telephone questionnaire assistance**—Telephone assistance was scheduled from March 7 to April 15 for type 2A DO's and March 23 to April 15 for type 2 and 3 DO's to give residents an opportunity to resolve their questions and complete questionnaires before nonresponse followup began. All telephone assistance operations were extended a few weeks due to the lower-than-expected mail response rate. A national news conference by the Bureau director and over 100 local press conferences supplemented the "It's Not Too Late" publicity campaign and informed the public that they still could return their questionnaires by mail. The AMOO and OOS managed the telephone assistance operation in the DO, which was scheduled for two shifts on Monday through Friday from 9 a.m. until 8 p.m. and on Saturday and/or Sunday from 9 a.m. until 6 p.m. These telephone questionnaire assistance times were expanded from 9 a.m. until 9 p.m., 7 days a week for all time zones.

Questionnaire assistance clerks were instructed to follow directions in the D-545 Questionnaire Assistance Manual and utilized Form D-561, Questionnaire Reference Book, to answer respondents' questions. Members of the public were encouraged to call the toll-free assistance number if they did not receive a questionnaire in the mail. Clerks tallied all incoming calls, using a separate Form D-399, DO/PO Record of Contact/Referral (Questionnaire Assistance), for each contact. This form had a section where clerks could specify the nature of the contact and record the respondent's address. These forms were used to identify problem areas and acted as advance notice of large nonresponse workloads.

**Walk-in assistance centers**—Type 1 DO office managers and census community awareness specialists (CCAS's) located free space to open walk-in assistance centers.

These centers were staffed by unaffiliated, bilingual (when appropriate) volunteer personnel who answered respondents' questions concerning the census and/or the completion of their questionnaires. Publicity for these centers was furnished by community-based organizations and the Census Awareness and Products Program (CAPP) networks by newsletters, flyers, and other outlets. Corporate sponsors donated free space in convenience stores for community-based volunteers. The program suffered staffing problems from the start and never realized its goal of rendering assistance in all type 1 DO's, although walk-in centers that were staffed furnished valuable information to the public. There were a few mobile assistance centers that utilized motor vehicles to move around to various locations in cities and dispensed the same service as the walk-in centers.

### Receiving Mail Returns

Vendors printed addresses on questionnaires, which they shipped to the various USPS centers for delivery on March 23 to housing units in mailout areas across the Nation. Instructions asked residents to complete the questionnaires and mail them back by April 1, 1990. The USPS sorted the returned questionnaires into four basic groups: short-form, short-form—surname keying,<sup>13</sup> long-form, and long-form—surname keying. After sorting, the USPS delivered them to the appropriate PO's and DO's.

**Processing-office mail returns**—After questionnaires for type 1 DO's were received in the PO,<sup>14</sup> they were sorted again (automated), checked in, batched, and, when needed, surname-keyed.

The questionnaires went through two sorts after they arrived in the PO. The first separated questionnaires by DO and the second grouped questionnaires into the following five categories: long-form—nonsurname keying, short-form—nonsurname keying, long-form—surname keying, short-form—surname keying, and all other questionnaires (anything else, mostly returns where the bar code could not be read by the laser sorter). During sorting the questionnaires were checked in and the envelopes were opened.

Questionnaires were then removed from their envelopes, unfolded (questionnaires were received folded in their envelopes), and placed in boxes by DO, long- and short-form, and surname/nonsurname. Batch clerks used scales or other measurements to determine 450 short forms or 100 long forms to a box. After batching, questionnaires that required surname capture were sent to keying, where clerks keyed the questionnaire ID into the computer, and keyed the surname of the first person listed in

<sup>13</sup>Required for questionnaires received from multiunit structures and housing units without house-number/street-name addresses. Followup enumerators used surnames to help solve apartment mixups and as an aid in locating nonresponding units.

<sup>14</sup>Processing office operations and questionnaire handling are covered in detail in chs. 7 and 8.

column 1. This operation enabled the surname (from a mail return questionnaire for multiunits and/or nonhouse-number/street-name addresses) to be printed on followup address registers.

**District-office mail returns**—Because of the time required by the USPS to presort questionnaires, many DO's received questionnaires as ordinary mail. The questionnaires returned directly to type 2, 2A, and 3 DO's were sorted, then batched by type, with 100 short- or 30 long-form questionnaires per batch. Each batch was assigned a control number, then checked into the collection control file (CCF)<sup>15</sup> by wand<sup>16</sup> the unit ID on the questionnaire and keying the surname of the occupant (if a surname-capture questionnaire). About 3,500 wands were in use when the bulk of the questionnaires were returned. The mail return check-in software contained a computer program that assigned a unique work-unit ID number and check-in date for each mail-return questionnaire. Clerks used this work-unit ID number to control their work batches.

### Mail Response and Return Rates

The mail response rate was calculated by dividing the number of mail returns by the total mailout. The denominator included vacant and nonexistent as well as occupied units. The mail return rate was calculated by dividing the number of mail returns by the number of occupied units in the mailback universe (including U/L).

Mail return rates were a measure of public cooperation with the census. In contrast, mail response rates were basically used for budgetary and operational planning purposes in determining workloads and staffing requirements for followup and other operations.

**Mail response rates**—Mail response rates (check-in rates), based on the daily reports on the Director's management information system (MIS), were calculated as the number of checked-in questionnaires returned by mail divided by the total number of questionnaires (on the address file) delivered by the USPS or census enumerators. These check-in rates showed the number of questionnaires checked in by the PO's and DO's; therefore, they differed from true mail response rates in that they reflected what had been processed, not necessarily what had been received. During the peak mail return, check-in backlogs occurred, thus understating the response rate. Also, these rates understated the level of public cooperation as they did not reflect the number of vacant and nonexistent housing units.

<sup>15</sup>The collection control file (CCF) was part of the collection control system in the DO. The CCF resided in the DO computer and contained geographic codes (such as ARA and block numbers), unit identification numbers, and other identification information for all living quarters in the district office area. Detailed information on the CCF and other DO automation is covered later in this chapter.

<sup>16</sup>Clerks used a bar code reader to record the bar code identification on all DO mail-return questionnaires. This bar code reader was a hand-held wand. The process of using this bar code reader to check in questionnaires was referred to as "wand<sup>ing</sup> questionnaires."

The 1990 census was heavily dependent upon having the public complete and mail back their preaddressed and geographically encoded questionnaires. There were 96.6 million addressed questionnaire packages in the initial delivery (including U/L) on or about March 23, 1990. This number increased to 98.2 million by April 23 and to 99.1 million by May 5, reflecting the added-unit questionnaires that were mailed out. Census planners anticipated a 70-percent mail response rate for the questionnaire packages sent through the mail or delivered by census enumerators. The lower-than-expected mail response rate had operational and cost implications for the census and its followup operations.

As of April 18, 1990, the national mail response rate was calculated at 63 percent, which was the check-in rate used for budgetary purposes for planning the nonresponse followup operation. The rate rose 2 percentage points to 65 percent from April 19 to 23 (66 percent by May). The check-in rates as of April 23, approximately 4 weeks after the start of check-in, were 66 percent for short-form and 60 percent for long-form questionnaires. Type 2 DO's finished with the highest check-in rates. The final check-in rates for the various types of DO's were as follows: type 1, 60 percent; type 2, 66 percent; and type 3, 64 percent. (See table 6.) Based on comparison with 1980 census data by type of area, the Bureau had anticipated that the check-in rate for type 1 DO's would be about 5 percentage points lower than the check-in rates for the type 2 and 3 DO's.<sup>17</sup>

Type 1 DO's accounted for about 18 percent of the national mail response. Reflecting the relative greater difficulty of enumeration, the check-in rates for both short (61 percent) and long (53 percent) forms were the lowest of all DO's. Type 1 DO's had the quickest start, having checked in 26 percent of the short forms and 18 percent of the long forms by March 30. Type 2 DO's had a workload of approximately 61.7 million questionnaires, which accounted for about 63 percent of the national mailback workload. Type 2 DO's had the highest check-in rates at 67 percent for the short-form and 62 percent for the long-form questionnaires. Type 2A DO's accounted for 10.5 percent of the national workload. As of April 23, their short-form check-in rate was 64 percent and the long-form check-in rate was 61 percent. Type 3 DO's accounted for about 8.6 percent (8.4 million) of the national workload. On April 23, their check-in rate for short forms was 65 percent and 59 percent of long forms. For the Nation as a whole, 65 million of the 99 million questionnaires delivered were returned by mail. (Refer to table 6 for a detailed summary.)

**Mail return rates**—The mail return rate was defined as the ratio of the number of households returning a census questionnaire by mail, to the total number of occupied housing units that received a census questionnaire delivered by mail or by a census enumerator.

<sup>17</sup>Mail Response Rate Report, April 25, 1990.



**Table 6. Final Check-In (Mail Response) Rates/Numbers**

| District office type    | Final MIS report date | Overall workload | Questionnaires checked in | Check-in rate (percent) |
|-------------------------|-----------------------|------------------|---------------------------|-------------------------|
| National totals.....    | -                     | 99,063,756       | 64,960,018                | 66                      |
| Short forms.....        | -                     | 82,509,617       | 54,814,440                | 66                      |
| Long forms.....         | -                     | 16,554,139       | 10,145,578                | 61                      |
| Type 1 DO's.....        | 05/01/90              | 17,740,150       | 10,686,874                | 60                      |
| Short forms.....        | 05/01/90              | 15,124,693       | 9,279,266                 | 61                      |
| Long forms.....         | 05/01/90              | 2,615,457        | 1,407,608                 | 54                      |
| Type 2 DO's.....        | 05/05/90              | 62,339,819       | 41,984,750                | 67                      |
| Short forms.....        | 05/05/90              | 52,054,227       | 35,487,966                | 68                      |
| Long forms.....         | 05/05/90              | 10,285,592       | 6,496,784                 | 63                      |
| Type 2A DO's (U/L)..... | 05/05/90              | 10,459,840       | 6,769,340                 | 65                      |
| Short forms.....        | 05/05/90              | 8,243,588        | 5,396,611                 | 65                      |
| Long forms.....         | 05/05/90              | 2,216,252        | 1,372,729                 | 62                      |
| Type 3 DO's.....        | 05/04/90              | 8,523,947        | 5,519,054                 | 65                      |
| Short forms.....        | 05/04/90              | 7,087,109        | 4,650,597                 | 66                      |
| Long forms.....         | 05/04/90              | 1,436,838        | 868,457                   | 60                      |

Source: 1990 Mailback Questionnaire Check-in Rates report, prepared by the Data Requirements Branch, Decennial Planning Division.

For the 1980 census, the Bureau budgeted for an 80-percent mail return rate and achieved an 83.3-percent rate. The 1990 census was budgeted for a 78-percent mail return rate, approximately 5 percentage points lower than the actual 1980 rate. The overall mail return rate for the 1990 census was 74.1 percent.

The 1990 mail return rates,<sup>18</sup> compared with the 1980 mail return rates, were as follows:

|            | 1990  | 1980  |
|------------|-------|-------|
| Overall    | 74.1% | 83.3% |
| Short form | 74.9% | 83.6% |
| Long form  | 70.4% | 82.0% |

### Questionnaire Edit

The clerical edit of questionnaires began on March 26 and continued through the entire census. The content edits included a review of the questionnaires for missed answers and/or multiple entries and were designed to improve data quality and reduce item nonresponse. The coverage edits included a review of questionnaires for potential missing persons. The short-form questionnaire contained seven population questions for each person and seven housing questions. The long-form questionnaire contained 33 population questions per person and 26 housing questions. Each questionnaire came in two formats: the mail-return questionnaire and the enumerator (return) questionnaire. (See ch. 14 for further discussion of the items on the census questionnaire.) The mail-return questionnaire was filled out by respondents in their own

homes. Mail-return questionnaires had a preprinted questionnaire ID that included the DO code number and a geographic code of ARA, block, and map spot (outside TAR areas) numbers. The enumerator questionnaire was used by enumerators on personal visit interviews during nonresponse followup (NRFU). Enumerator returns had an address box that the enumerator filled at the time of his/her visit, which contained the housing unit address, DO code, questionnaire ID number, and the geographic information (ARA, block, and map spot (outside TAR areas) numbers).

Type 1 DO mail-return short- and long-form questionnaires and enumerator-filled long forms were computer edited and failures reviewed at the PO's. The enumerator-filled short forms were computer edited but only failed the whole household usual home elsewhere (WHUHE) coverage edit (see below).

Questionnaire edit by computer in the PO's for type 1 DO's followed check-in, filming, and scanning of the developed film. The overall type 1 DO edit failure rate was 13 percent, with 11 percent of the mail return short forms and 49 percent of the mail long forms failing edit.<sup>19</sup> The final enumerator-filled long-form failure rate was 40 percent. The computer edit in the PO's was designed to match as close as possible the DO clerical edit described in detail below. (Processing office organization and questionnaire handling/processing are covered in chs. 7 and 8.)

Type 2, 2A, and 3 DO's mail short and long forms and NRFU enumerator long forms were manually edited by clerks in the DO's. The NRFU enumerator short forms, while not receiving a clerical edit, were checked for the WHUHE coverage in the assignment control unit. There was a quality assurance (QA) program (see below) that reviewed the quality of the edit clerks' work. Overall, the edit rate for type 2 and 3 DO's was 19 percent (11 percent went to telephone followup; see p. 31), with 17 percent of the mail short forms (8 percent went to telephone followup) and 30 percent for mail long forms failing edit.<sup>20</sup> The final enumerator long-form failure rate was 14 percent.

DO edit clerks followed instructions in the Clerical Edit Manual, Form D-532(A). After the questionnaires were checked in and surname keyed (if necessary), they were sent to office control. Edit clerks obtained work units (batches of long- or short-form questionnaires) from the office control area in the DO and returned to their work area, where they verified the total count of questionnaires and began editing. Clerks filled completed entries as needed in black pencil, but used purple-lead pencils to mark items on questionnaires that required followup.

Edit clerks first reviewed the mail-return questionnaires for general problems such as tears, stray marks, or mutilation, and that item G (ID No.) was filled (only if the form was not bar coded). Then clerks checked on coverage failures. Clerks reviewed the total number of persons indicated in item A and, if a person column was filled (at

<sup>18</sup>Executive Report—State of the Census Report, June 15, 1990.

<sup>20</sup>Executive Report—State of the Census Report, June 22, 1990.

<sup>18</sup>STSD 1990 REX Memorandum Series Q-8, December 2, 1991.

least two items filled in items 2-7) for everyone listed, to determine the true count of persons on the form. If the counts were not the same, the form failed edit. Because the questionnaire only had room to enumerate seven persons, all mail-return questionnaires that had entries in all seven person columns failed edit as there may have been more persons yet to be counted.

Respondents whose entire household usually lived somewhere else were asked to list their usual address. Clerks reviewed the questionnaire to determine if the proper address entry was made for question 1b (indication of whole household usual home elsewhere (WHUHE)). Forms that did not have sufficient WHUHE information would fail edit and go to telephone followup for confirmation of the WHUHE address. Later, clerks in the PO's checked to see if the household had been enumerated at the WHUHE address during a operation called search/match (see ch. 8). Mail returns that were either completely blank or had housing data but no persons enumerated were sent to telephone followup where clerks (using "cross directories" of telephone numbers by address) tried to contact someone at the address and verify the housing unit's status (vacant or occupied). If no one could be reached, the questionnaire would be sent to the field to be checked during field followup<sup>21</sup> as a failed-edit case. Clerks also checked items H1 and H2 to see if persons were missed or inadvertently added.

The edit clerks' next step was to review the body of the questionnaire to determine if all questions were properly answered (for content edits). They indicated which population items were left blank by writing the item numbers at the top of the appropriate person columns, and which housing questions were missed by circling the question number(s) that was skipped.

Once all questionnaires were appropriately marked, they were checked to see if they failed edit, meaning that the number of failures equalled or exceeded the number of allowed errors. The edit tolerances are listed below:

*Coverage problems:* The questionnaire fails if any one of these occurs.

- The questionnaire was blank or had only housing questions answered (mail return only).
- The respondent had seven or more persons listed on the roster (mail return only).
- The respondent indicated that the household had a usual home elsewhere (declared a WHUHE) and no address was entered below item 1b, or one or more addresses were entered in item 1b and all were different from the address on the label on the front cover.
- There was a population count discrepancy between the number of person columns completed and the number entered in item A.

<sup>21</sup>Field followup (FF) was a field enumeration/data improvement operation that was scheduled after nonresponse followup. It is covered in detail later in this chapter. (See p. 37.)

- The respondent had problems deciding who should be included on the questionnaire (mail return only).

*Content problems:*

- The respondent omitted answering two or more of the housing questions.
- The respondent did not answer two or more items for any person or any one item for all persons.
- The respondent omitted four or more of the sample housing questions and/or six or more sample population questions for any one person (on long-form questionnaires).

If the questionnaire passed edit, it was considered complete and was checked out, packaged, and shipped to the PO for data capture. Using their purple-lead pencils, edit clerks printed a "C" [complete] on the front covers of the questionnaires that passed edit, a "T" [telephone] for questionnaires that failed only the content edit, and a "TW" for questionnaires that failed the coverage edit (with or without content failures).

In the DO office control unit, clerks had to sort the "T" and the "TW" mail-return short questionnaires. All "TW" questionnaires went to telephone followup. The "T" questionnaires were sampled at a rate of 1:10. Every 10th questionnaire went to telephone followup while the remaining 90 percent were shipped to the PO without followup.

## **Last-Resort Information**

On every questionnaire, enumerators were required to get at least last-resort information—the minimum data required to make the questionnaire acceptable. Enumerators could only accept this information after three telephone attempts and two additional personal visits had been made, unless the case was a refusal or the respondent was away for an extended period of time. The basic information required for a last-resort enumerator return was as follows:

### **Occupied housing units**

1. At least three of the following four population questions for each person listed in question 1a: 2 (relationship), 3 (sex), 4 (race), and 6 (marital status).
2. Housing questions: H2 (building description) and H4 (owned/rented status) must be answered.
3. Completed "For Census Use" box for an occupied unit.

### **Vacant housing units**

1. Completed housing question H2.
2. Completed "For Census Use" box for a vacant housing unit.

**Edit quality assurance**—In this quality assurance (QA) phase, clerks went to the office control area and retrieved a work unit of edited questionnaires. The purpose of the edit QA operation was to verify the accuracy of the edit clerks' work. During the first 10 days of editing, QA clerks picked a random number (from 1 to 10) and verified every 10th questionnaire. For the remainder of the QA edit operation, clerks selected a random number (from 1 to 50) and verified every 50th questionnaire. Using green-lead pencils (purple had been used during the original edit), the edit clerks corrected edit marks on these questionnaires and recorded the discovered errors on Form D-380, Clerical Edit Quality Assurance Record. The data on form D-380's were keyed into the computer system to generate a weekly QA data report as feedback for the edit clerks. After verification, questionnaires were returned to the office control unit where telephone followup clerks retrieved their work. Each edit clerk trainee was allowed up to two work units to produce one work unit with an acceptable error rate (under 50 percent). The error rates for the two work units determined whether each edit clerk was qualified to do his/her job. The AMOO supervised these QA edit clerks.

## Telephone Followup

In the telephone followup unit, clerks made phone calls to respondents to obtain information for illegible, incomplete, and/or inconsistent answers. Clerks also reviewed returns from seven-person households to determine if a continuation questionnaire was needed. Clerks were required to make five attempts (lowered to three attempts for the last 3 weeks of the operation in the PO's due to the early start of field followup) to obtain the needed information. If they were unable to contact the respondent on the first try, they made additional calls at varying times and on different days. Once they made contact, the questionnaire was considered complete. If there was no contact, or no phone number could be found, the questionnaire was assigned for a personal visit (PV) followup. (All forms were marked "C" (complete) or "PV" following telephone followup.) Only mail-return questionnaires were assigned; enumerator returns did not go out again for a PV, even if the telephone followup clerk was unable to contact the respondent by phone. Clerks completed a Form D-382, Call Record Report, for each telephone followup questionnaire, recording all actions taken. After reviewing the questionnaire to determine what information was missing (all purple/green edit marks), they called the respondent to obtain information to complete the questionnaire. This included a roster check to verify that all household members were listed in the person columns.

In an 8-hour shift, telephone followup clerks were expected to resolve an average of 34 cases (long and short forms combined). This number represented the questionnaires marked "C" (for completed) and "PV" (for personal visit). During the peak workload period, type 2 offices had 16 clerks on each shift and type 3 DO's had 8 clerks per shift.

Formal telephone followup QA operations only took place in the PO's. Supervisory clerks monitored some telephone conversations to determine if clerks were conducting their interviews properly. Telephone followup was scheduled to end on June 16, but was continued in type 2 and 3 DO's to correspond with the completion of NRFU. As of June 23, approximately 8.5 million questionnaires had been processed through telephone followup, at a cost of roughly \$12.4 million. Overall, approximately 29 percent of the type 1 mail-return forms required personal visits during field followup. By comparison, 21 percent of the type 2 and 3 returns required a field visit.

## UPDATE/LEAVE OPERATION

### Introduction

The update/leave (U/L) methodology used a combination of a dependent canvass for coverage, questionnaire delivery by enumerators, and self-enumeration and mail-back census-taking. The Bureau used the precensus address list developed during the 1989 prelist operation for the U/L canvass.<sup>22</sup>

During the U/L operation, enumerators visited their assigned areas to update the roster of prelisted addresses. The enumerators visited each housing unit, verified or added its mailing address, map spotted its location on a census map, and left a preaddressed census questionnaire for the household. Residents were asked to complete and mail the questionnaires back to the DO; questionnaires also were left at vacant units, which would be enumerated during the NRFU operation (see p. 34 ff.). Using the ARA map, the enumerators canvassed their assigned ARA's, one block at a time. If enumerators found any units missed during the 1989 prelist, they added the units to the address register, spotted the locations on census maps, and prepared and left the proper type of census questionnaire to be completed and mailed back. Enumerators also deleted any addresses for housing units that did not exist or did not contain living quarters. They also updated the census maps to reflect missing streets and roads, name changes, and deletions of nonexistent features.

### Enumeration Procedures

Roughly 3 weeks before Census Day, enumerators took the U/L registers, original 1989 prelist maps, preaddressed questionnaires, and blank questionnaires to the field. The

<sup>22</sup>During prelist, enumerators visited assigned areas, listed mailing addresses and other information for housing units, and marked their locations on census maps. There were two prelist operations prior to the 1990 census—one in 1988 and the other in 1989. The 1988 prelist developed lists of addresses for the questionnaire mailout and the 1989 prelist generated address lists for update/leave areas. For the U.S. Postal Service to deliver a census questionnaire to a housing unit, the questionnaire had to have a recognizable mailing address. To solve inherent problems encountered when trying to create mailing lists related to specific housing units in some rural and seasonal housing areas (see ch. 2), the Census Bureau implemented the U/L procedures to update and check accuracy of the lists and to deliver questionnaires.

U/L operation was scheduled to begin on March 5, but the start depended on delivery of the preaddressed questionnaires. Long-form questionnaires for the U/L operation were delivered late because of contractor delays. Some DO's complained that delivered questionnaires were not in ARA/map spot number sort as specified by the print contracts. These DO's sorted the questionnaires manually, but the impact on the start of U/L was minimal. Once mailed back to the DO, all U/L questionnaires followed the same processing route as other mail-return questionnaires.

U/L enumerators added just under 400,000 valid addresses to the address files while delivering questionnaires to approximately 10.4 million housing units. Field costs for hours and mileage for enumerators and crew leaders for the update/leave operation were about \$15.3 million. By the expected completion date of March 30, only 27 of 79 type 2A DO's had finished U/L. An additional 24 DO's completed operation 1 week late and 11 other DO's within 2 weeks of the deadline. There were concerns that any significant delay would reduce the chances of receiving mail returns before the start of NRFU.

### **Quality Assurance**

The quality assurance program for the U/L operation consisted of initial and weekly reviews of enumerators' work by crew leaders. During these reviews, crew leaders observed their U/L enumerators and provided them with immediate feedback. At the completion of the review period, each crew leader determined if the enumerator was capable of working alone. If not, he/she was released and replaced.

Special small-scale urban enumeration operations, such as urban update/leave and urban update/enumerate, are covered on pages 47 and 48.

## **LIST/ENUMERATE ACTIVITIES**

### **Introduction**

The Census Bureau enumerated approximately 5.5 million housing units using the list/enumerate (L/E) methodology. L/E (formerly called conventional or door-to-door enumeration) occurred in all of the 70 type 3 DO's, although only two type 3 DO's were exclusively L/E. L/E procedures, used mainly in remote and sparsely settled rural areas and some seasonal housing areas of the country, were a combination of U.S. Postal Service delivery of an unaddressed short-form questionnaire (Advance Census Report, Form D-13, or ACR) and conventional house-to-house visits by census enumerators. New for the 1990 census were the enumerator-friendly questionnaires (EFQ's), forms D-1A and D-2A. Although these contained all the items on the standard questionnaire, they were worded suitably for personal-visit interviews.

Households in ARA's were sampled at the rate of 3 in 6 or 1 in 6, depending on the sample design (see ch. 9). Some ARA's were too large for one enumerator to complete in the assigned time, and the RCC's had to work with

the DO's to split some of the assignments to make the workloads more manageable. Registers for some ARA's with a 3-in-6 sampling rate had received address registers that indicated a 1-in-6 sampling pattern. Revised address registers were shipped from the DPD, where the additional shipments caused a shortage of backup registers.

### **Advance Listing**

The first field work done for the L/E operation was the advance listing of selected addresses. Advance listing was a quality control operation that measured the accuracy of the L/E enumerators' address listings. The FOS designated two blocks to be advance-listed in each odd-numbered L/E ARA. Clerks marked the point where the advance listing was to begin in each of these two blocks by penciling a red "X" on the corresponding ARA map. Between February 26 and March 12, enumerators (called advance listers at this stage) visited their assigned ARA's and located the starting point for the first selected block. Then they listed the first six addresses and related information for these places on the Quality Control Listing and Matching Record, Form D-169(L/E). Additional blocks were visited if necessary to obtain the six listings. They also spotted the locations of these six living quarters on a census map. This process was repeated for the second block. Crew leaders later matched these listings to the L/E enumerators' address registers for each odd-numbered ARA, allowing them to determine whether their enumerators were canvassing properly.

### **Enumeration Procedures**

The L/E operation was scheduled to begin on March 26 and end on May 11, 1990. On March 23, the postal carriers delivered unaddressed short-form questionnaires (ACR's, form D-13), to housing units in their areas. Instructions included with the ACR's asked residents to complete the questionnaires and hold them for pickup by census enumerators. Beginning March 26, enumerators with address registers, census maps, and blank copies of both short- and long-form questionnaires, began visiting housing units in the L/E areas of the country to collect or complete questionnaires.

Enumerators canvassed their assigned ARA's on a block-by-block basis, listed the address and other information for each living quarters, spotted the living quarters on the census maps, and collected the completed questionnaires. For living quarters without house-number/street-name addresses, the enumerator had to enter a location description in the address register to help the followup operations identify the exact location. Enumerators also updated the census maps. If a respondent did not receive an ACR or had not completed it, the enumerator interviewed, using the appropriate EFQ defined by the sampling pattern indicated on the address listing page. If the housing unit was designated for a long-form questionnaire, and the respondent had completed the ACR received in the mail, the enumerator edited the ACR and asked the

sample questions from the long-form EFQ while at the household. He/she simply transcribed the short-form information onto the long-form EFQ later at home.

## Reinterview

Reinterview was a quality assurance program carried out during the L/E operation. Its purpose was to detect data-falsification problems as soon as possible and to provide information to management so the appropriate corrective action could be taken. Reinterview was not intended to detect and correct errors on the questionnaires.

During reinterview, a specially trained enumerator (called a reinterviewer) verified (primarily by telephone) the occupancy status and household roster for a sample of L/E enumerator questionnaires. Personal visits were kept to a minimum because the reinterviewers did not have maps and their assignments sometimes were double the geographic area covered by regular enumerators. The reinterviewers, crew leaders, and crew leader assistants were supervised by an FOS who was responsible for other operations and not directly involved with the ongoing L/E operation. For the first 16 days of L/E, each enumerator's work was sampled for reinterview: The reinterview crew leader assistants (CLA's) selected one questionnaire per day from each enumerator for one-half of the crew leader districts (CLD's); the other half of the CLD's were sampled the next day. This was called the random sample phase. During the third week of the L/E operation, the reinterview staff began to select and verify the administrative sample. This sample was drawn for enumerators flagged on an administrative trouble report (D-344A) that indicated possible poor performance. For these enumerators, three questionnaires were chosen (using a random number table) from each one's work. CLA's transcribed each questionnaire's ID information and selected respondent information to a Reinterview Questionnaire, Form D-806, for verification. The original questionnaire was then returned to the FOS for L/E.

## Coverage Edits (Crew Leader)

Crew leaders reviewed questionnaires turned in by their enumerators. They were required to certify that each questionnaire was complete. On a flow basis, field staff returned completed questionnaires to the DO, where the assignment control unit reviewed and forwarded acceptable questionnaires to the ADP area for data entry/check-in or returned rejected questionnaires to the enumerators for correction. During the 1990 census, L/E questionnaires did not go through clerical edit and telephone followup. Crew leaders had daily meetings (when possible) with their enumerators to collect completed work and payroll forms, edit the enumerator returns and ACR's, and returned incomplete work for correction.

After check-in, ADP clerical staff batched the questionnaires. Data transcribers keyed the ARA, block, and map spot number from the questionnaire address label into the

collection control file (CCF); a program in the collection control system (CCS) then generated an identification number for each case. Clerks also keyed the form type, total persons, last-resort status, and the vacant/UHE status into the CCF. After the clerks updated the CCF, the ADP clerical staff transcribed the computer-generated ID numbers onto the questionnaires. The DO clerical staff shipped the questionnaires to the PO for data capture, and checked the questionnaires out of the DO on the CCF. Other clerical office staff assembled vacant/delete cases for field followup, while another clerical staff attempted to resolve duplicate questionnaires (ones with the same geographic codes as questionnaires previously checked in to the CCF) by comparing them with the address register listings.

## Merge/Sample Tolerance Check

After all the L/E questionnaires had been checked out of the DO, the clerical staff conducted the merge operation. Office staff compared the census geographic codes on the address register listing pages with the CCF listings of the L/E questionnaires checked out, to make sure that there was one—and only one—questionnaire for each listing. After merge, an automated sample tolerance check made certain that the observed population enumerated on long forms was statistically the same as the expected population on those forms. In other words, the sample tolerance check compared the distribution of household size (including vacants) for short- and long-form questionnaires and failed an ARA if the distribution was skewed at the low end for long forms. Sample-tolerance failures were corrected by having enumerators carry out long-form interviews for all resample cases that were changed from short- to long-form cases. During field followup, enumerators revisited these so-called sample-tolerance field conversions, housing units reported as vacant or deleted, and cases where no questionnaire could be located (missing).

By May 11, 1990, the scheduled L/E end date, 97 percent of the ARA's had been assigned and 53 percent of their work completed, and by June 15 only one ARA had L/E cases pending. This time overrun caused no significant delay in the followup operations. Enumerators complained that some of the L/E maps were not up to date, resulting in geocoding problems and lost time. DOM's complained that ARA's for L/E were too large geographically; although some RCC's split them before L/E began, some ARA's still could not have been handled by one enumerator and were further divided to ensure timely enumeration. Some type 3 DO's were responsible for immense areas of land; this complicated the daily exchange of completed work and payroll information, and revised procedures were issued in this regard. Some type 3 DO's contained mountainous parts of the country that were inaccessible during late March and early April due to heavy snows. There were some objections that the wage structure for rural areas was not high enough to attract the numbers of field staff needed to complete L/E on schedule.



## NONRESPONSE FOLLOWUP (NRFU)

### Introduction

NRFU was the largest field data-collection activity during the 1990 census, and took place in all DO's (except for two entirely L/E offices, Window Rock, AZ, and Hyannis, MA). It was scheduled to begin for type 1 DO's on April 26, and type 2, 2A, and 3 DO's on May 3, with all DO's scheduled to finish by June 6. The majority of census recruiting activities and a supplemental pay program (established as an incentive) were aimed at attracting and sustaining the large work force needed to complete NRFU. The DO's conducted multiple training courses for enumerators prior to the start of NRFU, with replacement training (for replacing field staff that quit or were released for poor performance) beginning immediately after the conclusion of the initial training sessions. Enumerators had 2 1/2 days of training, which included detailed instructions on payroll, map reading, annotating address registers, interviewing respondents, safety, and other special situations. Their NRFU training was structured to give them actual field experience interviewing respondents with long- and short-form questionnaires. Enumerators had detailed job instructions, form D-547, attached to the address registers for ease of reference.

The NRFU universe consisted of housing units for which mail-return questionnaires were not checked in by April 22, 1990. These housing units originated from the initial mail-out, as well as adds from the following operations: late casing housing-unit adds, late adds from precensus operations such as precensus local review (see p. 44); and housing adds from special-place prelist (see p. 49), yellow card coding, and field coding, where these housing adds could not be entered on the questionnaire-addressing tapes in time for questionnaire delivery.

Since mail-return questionnaires for type 1 DO's were returned to the PO, all type 1 DO's required weekly updates during the census to keep their automated systems current as to which questionnaires had been received at the PO and which units would be part of the NRFU operation. This information also was needed to assure adequate staffing for the operation. Although type 2 and 3 DO's received mail-return questionnaires in the DO, where the collection control file (CCF) could be used to track which questionnaires had been checked in, all DO's needed updated weekly information on added, deleted, and transferred housing-unit addresses. To accomplish this, all DO's received weekly computer "refresher" tapes (called TK-70's). These contained PO questionnaire check-in information for type 1 DO's and software instructions for printing address pages and/or other functions needed for address control file (ACF)/CCF maintenance throughout the census. The ACF/CCF interface updated both of these files with any questionnaires and addresses added from earlier census operations (such as casing), the status of mail-return check-in results (which identified those units that

had not returned a completed questionnaire), and surnames keyed since the last update. DO's loaded and ran the TK-70 tape to update the local DO system weekly.

Preparatory activities for NRFU were scheduled for the week of April 16-21 for type 1 DO's and April 23-28 for type 2 and 3 DO's. The EDP staff printed an assignment directory for the AMFO which was used to determine crew leader districts and enumerator assignments. The next step, concurrent with ongoing recruiting efforts, was the preparation of enumerator assignments and printing the assignment listing pages (form D-103A) for every mail-return ARA<sup>23</sup> in the country. The assignment listings, which contained all the addresses in the ACF, were printed by the assistant manager for EDP using the DO computer system, printing from the CCF. The assignment listings were in ARA/block number order (map spot numbers in ascending order also were included for type 2 and 3 DO's) with several blank address-add pages printed at the end of each ARA. Each DO printed two copies of the assignment listing—one was used by the field enumerator and the other in the office by the assignment control unit. Some DO's experienced software problems printing the assignment listings, thus requiring software revisions. Extra computer paper had to be rushed to certain DO's when the assignment listings had to be printed twice. A preprinted "NR" was placed in the code column of the listings that identified each NRFU case. Completed cases, where questionnaires had already been checked in prior to NRFU, contained "X's" in the code column. (Refer to app. 6D for an example of this form.)

The SOC, assisted by office clerks, separated the assignment listings by ARA and assembled the registers. The clerks, following instructions from the SOC and AMFO, took the listings for one assignment and combined them with the following forms: address register cover, enumerator instructions, confidentiality statement (form D-100B), blank address-add pages, callback record (form D-103B), chipboard back, and fasteners. The address registers and maps were then distributed to enumerators during their training.

At the completion of the assignment preparation, the EDP staff printed from the CCF a list of all mail-return questionnaires that had been received since the first printing of the register listing pages. This list of mail returns was called a late mail return (LMR) listing, form D-332. Type 1 offices received this information through the ACF/CCF interface from the PO, while type 2 and 3 DO's printed the LMR listings from the DO data base. LMR listings for type 1 DO's reflected surnames keyed and mail returns checked in to date. PO's stopped keying surnames after the LMR information was sent to the type 1 DO's. DO office clerks

<sup>23</sup>An address register area (ARA) was a geographic area established for data-collection purposes, usually consisting of several contiguous census blocks. For the 1990 census, an ARA generally represented one enumerator assignment, except in TAR areas where the geographic ARA's were divided into one or more assignments depending on the number of cases outstanding. An ARA was roughly equivalent to an enumeration district (ED) used for the 1980 census.

compared the LMR listing against the address registers and lined through every address that appeared on the LMR listing. However, surnames were printed on the address register to aid the field enumerator. There were no attempts to line through any LMR's received after the LMR listing was printed. Enumerators visited these cases and completed a questionnaire, even if the respondent claimed to have already mailed one.

## Enumeration Procedures

During NRFU, enumerators visited each nonresponse unit to determine the occupancy status of the unit on Census Day (April 1, 1990). Based on that status (occupied, vacant, or nonresidential), enumerators completed the applicable population and housing items on the proper type of questionnaire (short- or long-form, as indicated in the address register).

Enumerators deleted units from the assignment listings if the place was a business, duplicate, demolished, under construction on April 1, or condemned, or for other very specific reasons. Enumerators had to complete a Deletion Record, Form D-377, specifying the reason(s) the place was deleted. If enumerators identified an added unit in the field—one that existed on April 1, 1990—they listed the mailing address on the next blank line of the add page, map spotted the location (except in TAR areas) and interviewed a respondent.

Enumerators also made special notations in the address register to identify the unit status. At each occupied unit, the respondent was to be the householder (i.e., the household member who owned or rented the living quarters) or any other household member who was at least 15 years old. When the respondent and enumerator did not speak the same language, a school-age child could be used to interpret, the respondent could be offered a census guide in his or her language, or the enumerator could request assistance from the DO. Enumerators gave a Privacy Act Notice, Form D-31, to every person they interviewed.

An enumerator first visited the living quarters. If no one was at home there, or if no qualified respondent could be interviewed, the enumerator left a copy of Form D-26, Census Appointment Record, that alerted the occupant to the visit. Enumerators were asked (but not required) to record their telephone numbers on the appointment record so the residents could contact them for an interview. If the enumerators could obtain phone numbers for NRFU cases, they would make up to five additional attempts to contact the residents—three telephone attempts and two more personal visits at different times of the day, including evenings and weekends. If the enumerator was unable to obtain a telephone number, he/she would attempt just the two additional personal-visit callbacks. Enumerators were required to record all attempted revisits and phone calls on the Form D-103B, Callback Record. They used short- and long-form enumerator-friendly questionnaires (forms D-1A and 2A) for their personal interviews.

During the main enumeration phase of NRFU, enumerators were required to get more than last-resort information on every questionnaire—the minimum data required to make the questionnaire acceptable. (See p. 30 for details.) Enumerators could only accept last-resort information after the required number of callbacks had been made, unless the case was a refusal or the respondent was away for an extended period of time. Enumerators also had to print “LAST RESORT” on all such questionnaires for occupied units and “LAST RESORT—VACANT” on those for vacant ones. Approximately 3 percent of the occupied households in the Nation in TAR, prelist, and update/leave areas were enumerated during NRFU using last-resort procedures.

If the respondent refused to allow an interview and enough last-resort information could not be obtained from a knowledgeable resident or neighbor, the enumerator had to complete a Refusal Record, Form D-376, and return it to his/her crew leader. The FOS or crew leader had to resolve all refusal cases by the end of the NRFU operation, usually by again contacting the respondent.

Office clerks checked in and reviewed the enumerator returns from NRFU. Any questionnaire that did not pass office review was listed on an Error List, Form D-320. Causes for failure included the following: Lack of even last resort information, incorrect ID number and/or address, incomplete address label, a deletion record that did not contain a deletion code, or a case for which the respondent received the wrong type of questionnaire. The assignment control unit would indicate the reject reason on the questionnaire as well as on the error list. The office gave these forms to the FOS's, who distributed them to their crew leaders. The crew leaders took these lists along with the problem questionnaires or deletion records and gave them back to the enumerators for correction.

FOS's and crew leaders directly supervised the field staff. Following check-in, the EDP unit printed designated cost and progress reports daily and distributed them to DO management. AMFO's, FOS's, and crew leaders used these reports to monitor field activities. The Nonresponse Performance Report, Form D-341, listed every enumerator (by crew leader district), the work completed, hours worked, miles driven, and number of vacant, deleted, and last-resort cases. This report automatically flagged (identified) any enumerator who had low/high production, high mileage, or a high number of vacant, deleted, and last-resort cases. Enumerators in TAR areas were required to complete a minimum of 9 to 10 cases per 6 1/2-hour day, while enumerators in prelist areas had to complete 8 to 9 cases. Crew leaders were to meet with their enumerators every day to collect, review, and return (if necessary) completed work, discuss any enumeration problems, review any flagged categories on the performance report, and collect the payroll forms. Crew leaders were trained to take into account local conditions when evaluating enumerators. Those who failed to improve poor performance after counseling were released.



## Closeout

When a DO had completed 95 percent of its NRFU workload, the DOM reviewed the completion rates for each FOS. NRFU closeout procedures were instituted when the average completion for all ARA's under an FOS was at least 95 percent. Before closeout, the EDP unit printed out a cleanup list called a Nonresponse Units Not Checked In, Form D-342, that identified all the remaining NRFU cases requiring followup. This printout reflected all LMR's checked in since the generation of the LMR listing. During closeout, all work assignments were consolidated before going to the field, where the best enumerators were to make every effort to obtain an interview with an occupant or other knowledgeable respondent. There were no callbacks allowed during the closeout phase of NRFU; all vital information had to be obtained during one visit. If the enumerator could not obtain an interview, then he/she was instructed to get last resort information. If even that was not possible, the enumerators had to determine the housing-unit status (occupied, vacant). For occupied units, they tried to determine the occupant's name and the total person count from the occupant or a knowledgeable respondent. For vacant units, enumerators attempted to answer question H2 (building description).

**Supplemental closeout procedures**—An additional procedure required all DO's to take any case for which the enumerator was unable to obtain closeout information, and allow the crew leader one last chance to capture it. If the crew leader failed, then the DO completed a Census Closeout Address Check, Form D-550P, for these cases. The USPS took these forms and asked each route carrier to determine the occupancy status, characteristics of the structure, and the number of Census Day occupants. This procedure was not implemented during NRFU in most DO's due to timing and logistical problems. Nationally, only about 24,000 cases were referred to the USPS, and the majority of these were in the New York RCC (New York city and surrounding area).

In certain target areas, NRFU had to begin early, since students in 84 colleges in 49 DO's throughout the country would be on spring break or at the end of their semester during NRFU. DO's responsible for these schools had to collect information before these events happened. DO's early-enumerated only ARA's surrounding these schools to catch students living off campus and before leaving the area.

The entire budget for NRFU and subsequent operations was based on a 70-percent mail-response rate. Since that rate was closer to 63 percent, more field enumeration staff, questionnaires, mileage, and hours had to be added to the original budget projections. Due to the mail-response shortfall, the Census Bureau had to ask Congress for an additional \$190 million, which was appropriated in May 1990.

The NRFU operation was not completed by the scheduled date of June 6. As of June 4, approximately 70 percent of the workload was finished, with completion

rates for type 1 DO's at 60 percent, type 2 DO's at 68 percent, type 2A DO's at 79 percent, and type 3 DO's at 75 percent. By this date only 33 percent of the offices had begun closeout procedures and only two DO's had actually completed NRFU. Most of the delays were attributed to higher-than-expected workloads, staffing difficulties, turnover, and more part-time workers than anticipated. In response to the problems detailed above, the Bureau decided to implement a pay-increase program in 140 of the 449 DO's. By raising pay rates, it hoped to attract additional workers by competing more successfully with other employers in these areas and to motivate existing staff to increase hours and production. The Bureau also extended the supplemental pay program for existing field staffs as incentives for productivity and quality. Field Division also deployed headquarters staff to selected DO's to provide additional technical support. By July 3, 75 percent of the DO's assignments and 99 percent of the national workload was complete. By July 19, 98 percent of all DO's had finished NRFU, with the remaining 2 percent by July 30. Approximately 200,000 persons worked on the NRFU operation, which enumerated over 34 million housing units.

## Nonresponse Followup Reinterview

The reinterview program was a QA operation concurrent with NRFU designed to maintain standards in the data-collection effort. A separate enumeration staff in each DO, using a sample of questionnaires and deletion records completed during NRFU, carried out the program in two separate phases. The first, or random sample phase, involved a daily random sample of one case per enumerator for one-half of the CLD's in an FOS district; the second day's sample was selected from the other half of the CLD's in the FOS district. This pattern continued for the first 16 days of the NRFU operation. The estimated workload for the reinterview random sample phase was 1.2 million cases; 1.23 million cases were actually selected for reinterview.

The second phase involved examining administrative data such as vacancy rate, last-resort rate, deletion rate, daily mileage and production, and average population per occupied housing unit, to determine which enumerators' performances differed significantly from those of others working similar areas. The FOS responsible for the enumerator decided if there was an obvious explanation for the poor performance. If he/she could not, the CLA was to select three cases from the enumerator's completed work to be reinterviewed. The administrative sample (as it was called) was selected for out-of-tolerance enumerators beginning the third week of NRFU and continued through the end of NRFU. Approximately 347,700 cases were chosen during this phase.

CLA's selected the sample questionnaires and transcribed the original information (ID number, unit status, respondent name, telephone number, and household roster) to reinterview questionnaires, form D-806, and assigned

these to a reinterviewer who contacted each case either by phone (the preferred method) or personal visit.

The reinterviewer's job was to determine the original occupancy status of the house and complete the household roster as of Census Day and then compare information from the reinterview with that on the original questionnaire. If the comparison revealed enough differences to reject the case, the reinterviewer reconciled the differences and determined whether the original enumerator was responsible for the discrepancy. The NRFU FOS decided if the enumerator had falsified the data and whether any administrative action needed to be taken. In all cases, the respondent was interviewed again and the data were substituted for the original erroneous data. Enumerators were released if found to be falsifying data, but generally these cases involved few enumerators. Approximately 2,600 cases were reported as falsified in these samples. Table 7 summarizes the RCC reinterview program for NRFU.

## FIELD FOLLOWUP

### Introduction

The objectives of the field followup (FF) operation were to improve data quality and census coverage by following up on questionnaires with inconsistent or missing data items. This was accomplished by enumerators verifying the status of the units reported during NRFU as vacant or deleted, following up on questionnaires accounted for but missing or misplaced, checking addresses on the ACF for which no questionnaires were checked in, and revisiting units with coverage/content edit failures.

FF occurred in all types of DO's. During FF, enumerators visited pre-identified housing units to obtain information about the units and/or their occupants. Depending upon the type of FF case, the enumerator recorded and corrected information on either the original or a new

census questionnaire and/or a vacant/delete review, form D-160. FF was scheduled to begin on June 28 and end 27 days later, but 16 DO's completed NRFU early and were able to begin FF before the scheduled date. In the original census schedule, there was a 3-week "window" between NRFU and FF, during which DO's would complete the cycle 2 block split operation (see p. 41). It was decided to begin FF on the heels of NRFU to take advantage of the enumeration staffs "in place" at the close of NRFU. The estimated national workload for FF was 18 million units.

### Workloads

**Mailback areas**—In mailback census areas, the FF universe consisted of three components:

1. *Failed-edit cases* consisted of mail returns that could not be contacted during telephone followup. (Enumerator returns from NRFU that failed edit had to be resolved during telephone followup and were not part of the FF.)
2. *Residual nonresponse cases* for mailback cases where addresses had no questionnaires were checked out from the DO to the PO, or that had no record of data capture in the PO. Residual nonresponse for enumerator returns from NRFU was defined as any address for which an enumerator questionnaire was not checked in (noted by a check-in flag on the CCF) from the NRFU operation.
3. The *vacant/delete check* portion of the FF workload included most of the cases that enumerators submitted during NRFU as vacant or deleted cases. These were verified for accuracy of NRFU housing-unit status reporting.

Not all vacant/delete cases were part of FF. Questionnaires from areas that contained high proportions of seasonal housing or boarded-up buildings were withheld

Table 7. Reinterview Program Summary for NRFU, by RCC

| RCC           | HU's in reinterview |              |              | Preliminary decision |         |                 | HU's with falsified data*** |
|---------------|---------------------|--------------|--------------|----------------------|---------|-----------------|-----------------------------|
|               | Total               | Random phase | Admin. phase | Accept               | Reject* | Noninterview ** |                             |
| RCC total     | 1,577,976           | 1,230,287    | 347,689      | 1,368,939            | 83,121  | 125,916         | 2,612                       |
| Atlanta       | 155,922             | 131,051      | 24,871       | 135,068              | 6,775   | 14,079          | 305                         |
| Boston        | 112,660             | 88,814       | 23,846       | 96,928               | 6,775   | 8,957           | 306                         |
| Charlotte     | 177,969             | 137,161      | 40,808       | 156,245              | 7,776   | 13,948          | 192                         |
| Chicago       | 129,618             | 104,518      | 25,100       | 112,547              | 6,001   | 11,070          | 164                         |
| Dallas        | 177,016             | 141,018      | 35,998       | 154,821              | 7,779   | 14,396          | 152                         |
| Denver        | 73,885              | 68,738       | 5,147        | 65,513               | 4,077   | 4,295           | 38                          |
| Detroit       | 135,612             | 111,353      | 24,259       | 120,652              | 6,421   | 8,539           | 147                         |
| Kansas City   | 107,886             | 97,937       | 9,949        | 92,606               | 4,592   | 10,688          | 183                         |
| Los Angeles   | 101,125             | 67,964       | 33,161       | 75,177               | 13,382  | 12,566          | 122                         |
| New York      | 127,820             | 69,801       | 58,019       | 114,034              | 6,089   | 7,697           | 610                         |
| Philadelphia  | 142,087             | 99,903       | 42,184       | 124,072              | 6,631   | 11,384          | 272                         |
| San Francisco | 63,916              | 54,748       | 9,168        | 56,962               | 3,286   | 3,668           | 60                          |
| Seattle       | 72,460              | 57,281       | 15,179       | 64,314               | 3,517   | 4,629           | 61                          |

\*HU's whose original status or roster information was different from the data gathered during reinterview. These cases were considered suspect and referred to the FOS for final decision and action.

\*\*HU's identified for reinterview for which no contact was made to validate the original data.

\*\*\*HU's where FOS's confirmed that the original data were fabricated. Source: STSD 1990 Decennial Census Memorandum Series 0-8, September 18, 1990.

from the FF workload, as were those from units identified as deletes by two precensus address update operations and by the NRFU enumerator, or previously identified as vacant whole household usual-home-elsewhere (WHUHE) housing units. Enumerators also added any new housing units located during their enumeration.

**List/enumerate areas**—In list/enumerate (L/E) areas (see p. 32), the FF workload had three components:

1. The *missing questionnaire check* involved units that were listed in the address register, but no questionnaires were checked into the CCF.
2. The *vacant/delete check*, as in the mailback areas, verified all cases that were reported as vacant (except WHUHE's and pre-identified seasonally vacant units) and deleted during FF.
3. The *sample tolerance check* was a computer program run in the DO to determine if there was a proper ratio of enumerated population on short- and long-form questionnaires. ARA's that failed the sample tolerance test required enumerators to obtain long-form questionnaire data from households redesignated as sample units, which the L/E enumerator had originally enumerated on short-form questionnaires.

## Enumeration Procedures

DO preparations for mailback areas included printing and assembling the address registers. Type 1 DO's received ACF/CCF refresher tapes that included the most up-to-date personal-visit failed-edit component of FF for use in printing the FF listing pages (form D-106A). The actual failed-edit questionnaires were sent to the DO's from their respective PO's. Although address listings included all addresses in the area, FF cases were identified by codes—failed-edit cases by a "FE," vacant cases by a "V," and delete cases by a "D"—while residual nonresponse cases had an "NR" code in a specified column. For each vacant/delete case, clerks attached a preprinted label to a Form D-160, Vacant/Delete Review. DO staffs assembled enumerator ARA maps, blank questionnaires, address registers, failed-edit questionnaires, and D-160 forms for each enumerator assignment.

In L/E areas, the DO EDP staff printed the Record of Questionnaire Followup, Form D-384, from the refresher tapes. This listed all field followup cases by ARA, block, and map spot numbers, which enumerators used to locate the cases in the field. Special codes on form D-384 denoted the type of followup required: "M" for a missing questionnaire, "V" and "D" for vacant and deleted cases, and "R" for all cases that required resampling.

The AMFO obtained forms D-160 and D-384 from the EDP staff, and the address registers from the AMOO's area. The AMFO's clerks matched the forms D-160 to the address registers for inclusion in the proper assignment and matched forms D-384 with the appropriate address

registers. The AMFO distributed the assembled work to the FOS's and crew leaders, who assigned work to the enumerators. Enumerators who worked in an ARA during NRFU or L/E were not assigned the same one during FF.

Enumerators were required to attempt to contact the household up to six times (the initial visit, plus three telephone attempts and two additional personal visits). If the enumerator could not make contact during these attempts or the household refused to provide any information, the enumerator would try to obtain last-resort information about the population and housing data from a knowledgeable source, such as a neighbor, rental agency, apartment manager, and so forth. Enumerators deleted listings of nonexistent units, (although the only new deletes in FF were from the "NR" or "M" cases) and sorted out duplicate listings. Enumerators also added units that were not listed during the L/E operation or were missed during NRFU. Most new adds resulted from converting single-family units to two or more housing units, or from additional units found in multiunit structures, that existed as of April 1, 1990.

The FF operation went well, although some DO's did not start the operation on time. July 24, 1990, was the scheduled completion date for FF. A total of 395 DO's had finished as of this date, with 97 percent of the total workload completed. By August 1, there was a 5.3-percent conversion rate for deleted units to occupied (compared with 7.5 percent in 1980) and a 7.1-percent rate from vacant to occupied (10 percent in 1980). This translated into approximately 2.1 million persons added to the census counts as a direct result of the vacant/delete check.

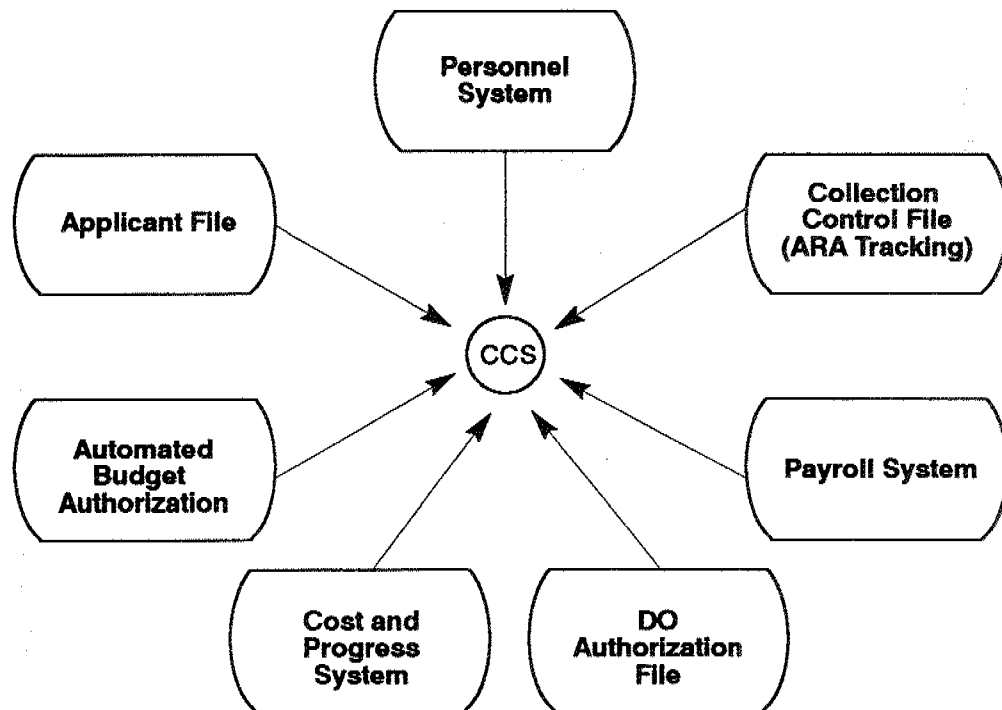
## SYSTEMS AND PROCEDURES COMMON TO ALL DISTRICT OFFICES

### District Office Automation: The Collection Control System (CCS)

The CCS had two major purposes: It supported data-collection activities by providing management information, such as progress, costs, and status of ARA's for census operations. It also generated address listing pages and other operational forms for field and office employees' use. The CCS included the following components (see figure 5):

**Collection Control File (CCF)** was a collection of files within the data base and an assorted set of programs which manipulated them for the purpose of field collection control. The CCF was located in the DO minicomputer system. DOD provided Field Division with a subset of the address control file (ACF) information for TAR, prelist, and U/L areas and geographic information for L/E areas. The CCF contained address information and geographic codes for all known living quarters in the DO's area. In L/E areas, the DO created the CCF by checking in questionnaires. DO managers used the CCF to account for the enumeration of housing units and group quarters (see p. 49). The CCF also tracked

Figure 5. Collection Control System (CCS)



address registers in some operations, and allowed the DO to compile management reports that were transmitted to the RCC and headquarters for management purposes.

**Cost and Progress System** was a file used to keep track of units completed, hours, miles, and other costs. This file was created from data entered from the payroll forms. It produced management reports showing cost and production data for enumerators, crew leaders, and FOS districts at the DO level, and summary reports for the RCC's and Field Division at headquarters.

**Applicant File (AF)** (see recruitment, p. 17) was a part of the data base that tracked the status of persons tested for census positions. The DO office staffs used this file prior to all field operations to print selection lists.

**Payroll File** was a set of files supplied by the Organization and Management Services Division (OMSD)<sup>24</sup> that enabled the DO to pay intermittent employees on a weekly basis.

**Personnel File** was a file that the DO created, which contained information from the BC-50A, Notice of Short-Term Employment. This file enabled DO's to print EEO reports, employee rosters, and other employment reports and/or comparisons.

**DO Authorization File** provided DO managers with authorized staffing levels for each operation. Thus, as work loads changed, staffing was adjusted accordingly with guidance from the RCC.

The DO hardware for the automated systems consisted of a minicomputer with various support equipment, terminals, printers, modems, and a tape drive. Field Division, DOD, and OMSD developed customized software so these systems would provide the DO's with timely reports. This information enabled the DOM's and RCC's to make informed decisions, made data collection more accurate and efficient, and allowed management to keep track of major field and office operations.

**ACF/CCF maintenance**—DOD at headquarters provided the DO's with a subset of the ACF that enabled them to structure their CCF's. Beginning in January 1990 on a weekly basis, DOD and the DO's exchanged TK-70 tape cartridges to ensure that the ACF and the CCF had the same information. The DO's received updated information on the ACF, CCF, surname file, and ZIP Code and county name file. In turn, the DO's sent weekly information back on their TK-70 tapes that updated information for DOD on the CCF and surname files. After each exchange, the DO's printed form D-108B, supplemental address listing pages, which showed all the units added since the last update. The DO's used this form to obtain identification numbers (ID's) for added units to the ACF.

DO's completed a Form D-378, ACF Maintenance Record, for all address action cases. Action cases included address "adds," "kills," and moves. This form was sent to the ACF

<sup>24</sup>The Organization and Management Services Division (OMSD) became the Management and Security Systems Division (MSSD) in January 1991. Text references will use OMSD.

maintenance unit (located in the Baltimore PO) to request the specific action needed for the unit(s). The Baltimore PO returned a listing of all transactions accepted and rejected (with an explanation for the rejected cases) to the DO's. DO's then reviewed the rejected actions, investigated the problems, and resubmitted the corrected information on the next submission. The TK-70 tapes, which came from headquarters, provided the latest version of the ACF, including all accepted transactions since the last cycle.

The ACF/CCF weekly interchange for type 1 DO's contained additional information for the DO's. Since PO's processed all mail-return questionnaires for type 1 DO's, these weekly tapes updated the DO system on mail-return check-in, edit, and data-capture results. Field Division also used the weekly updated information to estimate their NRFU and FF workloads. Type 2 and 3 DO's updated their ACF's when questionnaires were checked in.

The CCF received input from the following keying/scanning operations: ARA tracking, yellow-card keying for adds and moves, group quarters checkout, precensus local review, blue-card keying for added units from the casing operation, mail-return check-in for type 2 and 3 DO's (PO's checked in mail returns for type 1 DO's), surname keying for selected housing units, postmaster returns (PMR's), assignment structuring, NRFU check-in, L/E check-in and merge maintenance, failed-edit or personal-visit FF checkout, FF check-in (including L/E), postcensus local review, and final checkout.

The CCF was programmed to print assignment listings (i.e., the address listing pages) for the following operations: Precensus local review—(D-108A), U/L—(D-105A), NRFU—(D-103A), cycle 2 block splits—(D-110A), FF—(D-106A, and D-384 for L/E and mailback areas), and postcensus local review—(D-111A), as well as blank listing pages, which served as "add pages," and the callback records (as applicable).

## **Cost and Progress Reporting**

Field Division developed an internal automated cost and progress system that gave DOM's, RCC's, and the headquarters management information system (MIS) information regarding the DO's actual versus budgeted production and expenses. The system compared authorized spending levels for hours and miles, by operation and production levels (from the office manager's automated authorization file), with actual hours, miles, and expenditures (from Form D-308, Daily Pay and Work Record), and completed cases from the CCF. The system furnished enumerator production information and generated five management reports: three in the DO and two in the RCC and headquarters.

The cost and progress system (CPS) produced, daily, three reports for the DO and two reports for the RCC. DO report No. 1 displayed for enumerators and clerks the actual cases/hour, cases/day, miles/case and other costs/case, percent of assignment complete, and the number of ARA's completed to date. Twenty-three field and 32 clerical

operations utilized these reports. DO report No. 2 provided summary information for FOS's by crew leader district for certain field operations. DO report No. 3 compared the actual and budgeted production hours, miles driven, and work load for each operation. Major operations had two lines of data on this report, one for training and one for production. Each RCC CPS report contained detail lines for each DO that were the same as the summary lines from DO report No. 3. The RCC report No. 2 was a "Budget versus Actual" report by operation code with a detail line for each DO and an RCC summary line.

## **Applicant File**

The applicant file (AF), maintained by the DO staff, tracked the status of persons tested for census positions and printed status reports for recruiting. This file provided information on all applicants who were available for work or who were experienced, selected, currently working, or terminated, and on applicants who failed the initial review or had refused a job. Since all applicants had to be cleared by the Federal Bureau of Investigation (FBI), Field Division also used the AF to check potential employees with the FBI. (A more detailed description of the AF is on p. 18.)

## **Final Checkout and Shipping of Questionnaires**

Questionnaires were assembled in groups called "work units" that contained either short- or long-form questionnaires. The DO's EDP section sorted the questionnaires in these work units and sent them to the DO's office control unit, which routed them through the edit, edit quality assurance, and telephone followup operations. After questionnaires were reviewed and accepted, clerks sent the work units to the EDP section for final checkout. The questionnaires were assembled in batches of approximately 100 long or 450 short forms. These batches were given different names to denote their source. For example, mail-return questionnaires were titled "CM" batches (checkout—mail); L/E returns were batched and titled as "CL" (checkout—list/enumerate). Each batch was assigned a special shipping label with a 10-digit number that was keyed along with the batch name, keyer/verifier ID, document count, and form type. Batch clerks packaged questionnaires in shipping boxes and placed the shipping label on the end of each box. The EDP section printed and transmitted the Final Checkout Report, Form D-368A, to the RCC every Friday.

Since the DO's were transmitting confidential data, it was extremely important that the questionnaire shipments were sent properly. Jeffersonville sent one box of questionnaire shipping materials to each DO before Census Day. These boxes contained a unique set of prenumbered air express labels (overprinted with the DO address and the appropriate PO address), air express routing labels, color spots (used by the PO to quickly determine misrouted boxes), and pickup manifests. These special labels and manifests were designed by the Census Bureau and the carrier's representatives to aid in the unique tracking

system used to oversee questionnaire shipments. Type 2, 2A, and 3 offices began shipping questionnaires to the PO's on April 5, type 1 DO's on May 4.

There were some minor problems with questionnaire shipments during the census. Some DO's misused the special labels for other shipments, while the carrier temporarily interrupted delivery for a few days due to contract problems. Shipments were generally delivered on time, however.

The adaptation of the ACF/CCF in the 1990 census and the adoption of flow processing allowed the DO's to send questionnaires to the PO as soon as they were accepted by the CCF as complete. Since PO's did not have to wait until data collection was finished before beginning to process census questionnaires, data capture was completed in a much more timely fashion in 1990 than in 1980.

### **Management Information System (MIS) and Other Reporting Systems**

The purpose of the 1990 Director's MIS was to provide a centralized data base of schedule, cost/progress, and authorization information for the coordinators and staff within the Decennial Planning Division (DPLD) at headquarters. The system was designed to maintain control of the census schedule, control costs commensurate with progress, and allow quick pinpointing of problems. The system was intended to be "user friendly" with minimal computer expertise required. Reports available from the system included tabular displays and graphic output that integrated performance measures of costs and progress with the schedule.

The 1990 census was a large data collection/processing activity that spanned a 10-year cycle from the planning stages to the final tabulation of reports. The MIS cost and progress reports for the 1990 census were available for the first field activity—prelist (1988 and 1989)—and were scheduled to continue through 1993. Between these years, some 449 DO's, 7 PO's, and over 0.5 million people collected and processed questionnaires from over 102 million housing units. The Bureau managed the census through a cooperative effort among more than 20 divisions. While decisions for the census were made "by committee" with input from various divisions, DPLD had the overall coordinating/planning responsibilities, with oversight duties to ensure that budgets and schedules were met. The Director assigned DPLD the task of developing an automated system to establish a hierarchy of information flow on census activities from the decennial divisions, through DPLD, to the executive staff. The system was organized into two modules to reflect the two types of data needed— (1) schedule and (2) cost/progress. Each activity was monitored through the schedule, where updates and written reports were required.

The schedule structure was defined by listing the 1990 census operations that would require monitoring. The data base had a hierarchical design that mirrored the coordinator levels. In general, specific dates and detailed assessments were found at the lowest level, while the higher

levels contained larger assessment fields. All levels had fields that contained names and acronyms for assignment of responsibility.

**District office management and tracking system**—This system monitored the progress of the various DO's throughout the country. It was kept in the RCC and was the primary responsibility of the designated RCC contact, usually the area manager (AM) or the RCC technician (RT). The tracking system was fundamentally designed as a reference tool for RCC personnel. Each DO received a binder that contained various report forms for each operation that required notations on the various stages. Through the timely maintenance of the forms, the RCC would know the status of operations within the DO's at any given time.

The AM and/or the RT, through telephone conversations with DO management staffs, inquired about the current status of operations by referring to worksheets in the tracking system binder. Specific objectives and scheduled completion dates were preprinted on the forms in the binders. RCC personnel entered the actual date that each objective was met, and/or recorded an explanation of what problems were being encountered. There was space for pertinent remarks concerning the DO—why it was behind schedule, or why it was ahead. On a weekly basis, each AM or RT provided summary information for his/her assigned DO's to the ARCM. The summaries from each AM or RT were compiled into a RCC summary for each operation that was transmitted back to the FLD Project Management Staff at headquarters for analysis. Overall, the system worked very well, although the headquarters contacts had to remind some RCC's to keep up to date with these reports since they were manually compiled and took time to complete.

### **Cycle 2 Block Splits**

The success of a census rests not only on data collection and data capture, but also on linking those data to the correct tabulation geography. For 1990, the process of assigning each housing unit or group quarters in collection blocks split by legal or statistical boundaries to its proper geographic unit was referred to as the block split operation.

The Census Bureau's TIGER (see chapter 3) data base contained the boundaries and codes of geographic areas such as census tracts, block numbering areas (BNA's), and block groups (BG's), which served as the foundation for forming DO's and ARA's. Together with the census blocks, these represented "collection geography." This gave enumerators assignment areas that were likely to be easy to locate and canvass because the area boundaries consisted primarily of visible features such as roads, rivers, and railroads; of course, some did have invisible features such as State and county lines.

Tabulation areas, on the other hand, were delineated for the purpose of publishing results by the appropriate legal or statistical areas, without reference to the enumerator



assignments. While many tabulation boundaries coincided with collection boundaries, more than a few did not follow visible features and were hard to locate in the field. Also, a number of legal boundaries used for collection underwent changes, due to both official actions and mapping errors. As a result, many tabulation boundaries split collection blocks into two or more parts. To tabulate data from the census, housing units and group quarters in these collection blocks had to be assigned to the proper tabulation areas. This was accomplished by adding a suffix to each portion of the collection blocks; for example, collection block 101 may have been split into blocks 101A for the portion in the city and 101B for the portion outside. All tabulation blocks and their associated codes and names supported the creation of the edited detail file (EDF) and all tabulation and publication programs.

To assign addresses on the ACF to their tabulation blocks, the Geography Division provided the DOD with geographic reference files (GRF's) that identified all tabulation areas and their equivalent collection areas. Most of the conversion process was accomplished by linking whole ARA's or blocks to their respective tabulation units through an automated recoding of the ACF. The living quarters within collection blocks split by one or more tabulation boundaries and containing one or more people and/or housing units required clerical research or field resolution to allocate them to the appropriate tabulation blocks.

There were three major cycles of block splits for the 1990 census. The first cycle, which occurred before Census Day, was intended to reduce the workload in the second cycle, which had a very tight schedule (approximately 3 weeks). Cycle 1 (see ch. 3) was limited to (a) blocks split by stable tabulation boundaries in mailout areas, and (b) blocks split by boundaries of places that did not have frequent annexations or complex boundaries in TAR areas.

Cycle 2 block splits were performed during the completion of NRFU and the start of field followup, and encompassed all types of enumeration and tabulation areas. These were based primarily on legal boundaries, which were those in effect on January 1, 1990—the official date for boundaries used in the 1990 census—based on the Census Bureau's Boundary and Annexation Survey (BAS), but also included some statistical areas. The BAS was conducted throughout the decade; it updated 1980 census information to recognize certified boundary changes, newly established entities, and deletion of entities that had been abolished since January 1, 1980.

The DOD transmitted the universe of split ARA's, split blocks, and the list and number of housing units within those blocks to the CCF via the ACF/CCF interface tape. The FLD programmed the print files to generate address listings (form D-110A) of DO's, ARA's, and blocks that required a split and produced a Master List of Block Splits, Form D-338. This control list provided an inventory of split

ARA's, the number and list of split blocks within each ARA, and the number of units within each split block. Any blocks with "0" population and housing were suppressed from the address listings.

The address listings (D-110A) for TAR areas included split blocks that GEO and DOD were unable to recode in an automated fashion. The DO's printed the listings for their areas. These listings showed both the units that had been assigned a suffix through earlier operations and those that had not. In prelist areas, the control listings carried a flag to indicate that boundaries had changed since cycle 1 or where additional housing units had been identified since the original split. In L/E areas, the address listings carried all ID numbers and geocodes for map spot numbers (as keyed into the CCF) in blocks that were split by tabulation boundaries. In L/E areas, there was no time to key the address registers from these field operations into the ACF before block splits, so the DO's had to use the original registers and maps to perform the split operation. In U/L areas, the D-110A address listings contained all addresses keyed from the 1989 prelist and any adds from the U/L operation in the split blocks.

The types of boundaries that caused block splits during cycle 2 primarily defined the following political areas: Counties, minor civil divisions (MCD's), incorporated places, American Indian reservations, American Indian off-reservation trust lands, Alaska Native regional corporations, congressional districts, voting districts, and sub-MCD's (in Puerto Rico only). In addition, some blocks required splits for statistical area boundaries that did not follow collection-block boundaries.

During the block split operation, DO's assigned each housing unit or group quarters to the correct tabulation geography—that is, the suffixed block number—based on the location of the political and statistical boundaries as of January 1, 1990. The objective was to do as many splits in the office as possible; DO staff had to go into the field to resolve residual cases.

When cycle 2 was complete—that is, all living quarters in split blocks had been assigned to a suffixed block—the DO's returned the annotated address listings to the ACF maintenance site (Kansas City) for keying, and forwarded the block-split maps and the enumerator maps to the MDO. The MDO retained these materials until the conclusion of the postcensus local review recanvass, at which time it sent them to the RCC for the late-receipt block split operation. There was a second round of block splits ("cycle 2 residual block splits") in the basic DO's between August 27-31, 1990. The workload for this operation consisted of (a) residual cycle 2 block splits that were not completed in the field during the original cycle 2 schedule and (b) addresses that were incorrectly machine-coded and should have gone to the DO's for clerical coding. The overall estimated workload for the cycle 2 block split operation, including the residual splits, was 348,000 blocks, while the actual workload was 324,194 blocks. Table 8 displays the actual block split workloads by RCC and by cycle.



**Table 8. Total Block Split Workloads, by RCC and Cycle**

| RCC                 | Total block splits (cycles 1 and 2) | Cycle 1 block splits | Cycle 2 block splits |
|---------------------|-------------------------------------|----------------------|----------------------|
| Total .....         | 413,892                             | 89,698               | 324,194              |
| Boston .....        | 14,032                              | 3,859                | 10,173               |
| New York .....      | 5,506                               | 452                  | 5,054                |
| Philadelphia .....  | 14,073                              | 3,923                | 10,150               |
| Detroit .....       | 50,363                              | 17,597               | 32,766               |
| Chicago .....       | 72,275                              | 21,493               | 50,782               |
| Kansas City .....   | 78,347                              | 9,916                | 68,431               |
| Seattle .....       | 14,909                              | 3,503                | 11,406               |
| Charlotte .....     | 46,035                              | 10,995               | 35,040               |
| Atlanta .....       | 37,643                              | 6,286                | 31,357               |
| Dallas .....        | 33,070                              | 4,732                | 28,338               |
| Denver .....        | 33,622                              | 2,507                | 31,115               |
| Los Angeles .....   | 4,631                               | 1,554                | 3,077                |
| San Francisco ..... | 9,386                               | 2,881                | 6,505                |

Source: Cycle 1 Block Splits Progress Report, December 18, 1990  
 Cycle 2 Block Splits MIS Report, December 31, 1990

The block split operation was scheduled to take place in a 3-week window between the close of NRFU and the beginning of FF. Due to delays in product delivery, extended NRFU schedules, and the decision to begin FF on the heels of NRFU as noted on page 37 (thus overlapping with the schedule for block splits), there was insufficient time to complete the block split operation. Any remaining block splits were completed later by the RCC's. Cycle 3 block splits were performed in the RCC's on a flow basis.

### The Local Review Program

The local review program was one of the Bureau's coverage-improvement efforts for the census; it gave eligible active, functioning local and American Indian/Alaska Native governments an opportunity to review census maps and counts (at the block level only) to identify possible discrepancies. Only those governments located in areas that were enumerated using the mailout/mailback method were eligible to participate in the precensus local review program (approximately 20,000), but all (39,500) governmental units (GU's) could participate in the postcensus local review program. Plans called for the eligible GU's to compare the Bureau's block-by-block counts of housing units (HU's) and special places (SP's) in their jurisdictions with their own records before the census began, and then to review the preliminary housing-unit and group quarters (GQ) population counts resulting from the enumeration. The first comparison would alert the Bureau to the need to add missing addresses to its address file and to adjust positions for unexpected workload changes; the second, after the census, would allow the reconciliation of discrepancies and recanvassing of problem areas, as appropriate, before the district offices closed.

The program began in November 1986, when all GU's were sent letters describing the program and requesting that each chief executive/highest-elected official (CE/HEO)

appoint a liaison. Approximately 72 percent of the governments responded to this mailout, with 51 percent appointing a liaison. After that initial contact, various updates to the liaison list were the responsibility of the appropriate RCC. All RCC's maintained a data base for all GU's in their jurisdiction, and used it to generate labels for all mass mailouts. Regardless of how or whether governments initially responded, the Census Bureau continued to contact and send materials to all that were eligible.

On July 15, 1987, the Census Bureau mailed the *1990 Decennial Census Local Review Program Information Booklet* to the 39,500 GU's. This was a 60-page document that outlined the procedures for participating in the voluntary program. In the fall of 1987, an 8-page supplemental news insert was published in three national associations' newspapers—the National League of Cities' *Nation's Cities Weekly*, the National Association of Towns and Townships' *National Community Reporter*, and the National Association of Counties' *County News*. The insert promoted the GU's active involvement in the program.

From fall 1987 through the spring of 1988, the Census Bureau sponsored training workshops nationwide for local officials interested in participating in the local review program. State agencies that were involved with the Census Bureau's State Data Center (SDC) and/or Federal-State Cooperative for Local Population Estimates (FSCPE) programs conducted training in most States. The RCC's were responsible for training the State agencies and for workshops in areas of the Nation where State agencies did not participate. These workshops focused on the purpose of the census, census definitions, geographic and map concepts, methods for creating a comprehensive block-by-block housing unit and GQ data base, and program schedules and procedures. In June 1989, the *1990 Decennial Census Local Review Program Technical Guide* was mailed to all GU's. This technical guide contained further information on the program and detailed how local officials could review and contest block counts. In addition to this guide, SDC's/FSCPE's and RCC's supplemented the guide by conducting a second series of workshops in the summer of 1989.

In the spring/summer of 1989, the Census Bureau mailed copies of the block-numbered precensus maps to all local and tribal governments. Governments eligible to participate in the precensus local review (mailout/mailback areas) used these maps to prepare HU and SP estimates for collection blocks. The governments in U/L and L/E areas also received maps so they could prepare their local estimates, by block, for the postcensus local review. Maps also were sent to the SDC's/FSCPE's and the appropriate DO's for reference purposes.

The GEO developed the map software and produced the maps. Precensus maps displayed the appropriate names, codes, and boundaries for each local and tribal government. These maps depicted legal boundaries as they were reported to the Census Bureau up to and including the 1988 Boundary and Annexation Survey (BAS) to help identify the collection blocks within and crossing

each GU's boundaries. Census tracts or block numbering areas (BNA's) and census blocks appeared on the maps. For tribal governments, the maps displayed boundaries as reported by the Bureau of Indian Affairs (BIA) for federally certified reservations and by the appropriate State officials for State-recognized reservations.

The Census Bureau encouraged local GU's to review the boundaries on the precensus maps to determine whether the ones obtained through the BAS were represented correctly on the maps. If the local officials determined that the boundaries were in error, they were instructed to contact the BAS certifying official. The Bureau accepted boundary corrections only from that person. The GEO provided RCC's with lists of the local BAS certifying officials for reference.

**Precensus local review**—Precensus local review counts were compiled early and were mailed from the RCC's about 1 week ahead of the scheduled date of November 4, 1989. These listings displayed HU and SP counts at the census block level for each GU. The GEO gave the DOD the geographic reference files (GRF's) needed to produce the precensus local review listings conforming to the identical geography displayed on the census maps. Listings also were sent to the lead agency of the SDC/FSCPE (on computer tape only), and to the appropriate DO (on paper only) for reference purposes. The computer tapes were produced and sent to the GU's by certified mail, return receipt requested, by the Data User Services Division (DUSD).

Governments were given 45 workdays (including Saturdays)—but no later than January 5, 1990—to review and respond to the block counts. Extensions were granted until January 15 for areas in California (due to the 1989 earthquake) and various areas of the Carolinas (due to Hurricane Hugo damage); responses were accepted until the end of January, but the Bureau was willing to respond to late receipts. Officials who chose to participate were asked to compare the block counts against their comprehensive local estimates, identify and document discrepancies, and annotate Form D-74A, Precensus Local Review Response, with specific block-count problems. A letter (sent with the counts) instructed the GU officials to send their local estimates and the required documentation on the basis for the discrepancies to the local MDO. Table 9 displays the regional and national response rates.

The DOM reviewed the annotated form D-74A to determine that the local estimates were as of November 1, 1989, conformed to census geography (blocks), and were based on comprehensive source files. If acceptable, the DOM forwarded the D-74A to the AMEDP for keying into the CCS, which ranked discrepancies based on established tolerances. For housing units, the DO staffs selected blocks containing the largest positive discrepancies (local estimates usually were greater than the Census Bureau count) until these totaled up to 3 percent of all HU's within the DO's boundaries. There were some software and

**Table 9. Precensus Local Review Governmental Response**

| Region              | GU's eligible | GU's responding | Percent |
|---------------------|---------------|-----------------|---------|
| National .....      | 21,048        | 3,440           | 16.3    |
| Boston .....        | 2,153         | 406             | 18.9    |
| New York .....      | 221           | 60              | 27.1    |
| Philadelphia .....  | 3,166         | 452             | 14.3    |
| Detroit .....       | 3,471         | 300             | 8.6     |
| Chicago .....       | 5,824         | 869             | 14.9    |
| Kansas City .....   | 2,150         | 217             | 10.1    |
| Seattle .....       | 470           | 104             | 22.1    |
| Charlotte .....     | 995           | 263             | 26.4    |
| Atlanta .....       | 681           | 193             | 28.3    |
| Dallas .....        | 813           | 151             | 18.6    |
| Denver .....        | 594           | 213             | 35.9    |
| Los Angeles .....   | 241           | 108             | 44.8    |
| San Francisco ..... | 269           | 104             | 38.7    |

Source: 1990 STSD REX Memorandum Series 0-4, January 17, 1992.

backlog problems experienced in keying these responses, which resulted in small delays in establishing the overall national recanvass workload. To reduce potential challenges in the postcensus program, the Bureau instructed all DO's to recanvass every challenged block in which the census counts were below the local count by at least five housing units—approximately 63,000 blocks that contained 4.3 million HU's for 2,885 GU's. Over 438,000 HU's were added to the ACF as a result of the recanvass.

The AMFO prepared assignments and address registers and assembled the appropriate ARA maps. The AMEDP printed the address listing pages for all blocks within the ARA, using the latest ACF/CCF refresher tape sent back to the DO. When these address listing pages were combined with additional blank "add" pages, they comprised a complete address register. The address listing pages contained both census and basic street address information for each HU and SP in the blocks selected for recanvassing within an ARA. Between January 16 and February 2, enumerators canvassed the blocks, visiting each structure and identifying whether there were any HU's and/or SP's missed or misallocated.

The DOM, with the support of the clerical staffs, responded to each GU that provided properly documented local estimates during the precensus local review. The response informed the GU how its complaints were handled, but did not detail the number of added, deleted, or transferred units. After recanvass, the DO completed a Form D-378, Address Control File Maintenance Record, for all adds, deletions, and transfers (HU's that were transferred to another block or ARA). These forms were checked against form D-108A to verify that they were "true" adds before the DO shipped the D-378's to the ACF maintenance site in the Baltimore PO for keying and updating. Finally, the DO generated address labels using the CCS after the ACF update was completed and the CCF refresher tapes had been received from headquarters. These labels were used to mail questionnaires, because there would be no vendor-printed questionnaires for these adds due to their late discovery.

Special-place information was forwarded to the special-place operations supervisors (SPOS's), who added them to the SP listings (form D-329) and assigned them to the SP prelist operation. (See section on special-place activities later in this chapter.)

**Postcensus local review**—The first phase of postcensus local review began when the RCC's sent all CE/HEO's or their local review liaisons the postcensus local review map(s) for their respective GU's in June 1990. While the Census Bureau encouraged all local and tribal governments to prepare for local review—by investigating existing record-keeping systems or creating new ones that were capable of producing comprehensive local estimates at the block level—the actual work of refining the local estimates files for postcensus local review began when they received the precensus maps. Local review liaisons examined the census geography displayed on the postcensus maps, which showed the suffixes for the split collection blocks and any additional whole blocks inside the GU as a result of boundary changes. As with the precensus local review, a good deal of the liaison's time—from the receipt of the map in June 1990 until the receipt of the counts in August 1990—was spent assigning the census block numbers displayed on the map to the locally prepared estimates. The vintage of the legal boundaries displayed on the map was dependent upon the timeliness of the GU's response to the 1990 BAS.

Features on the postcensus local review maps included names and boundaries of counties, MCD's, CCD's, incorporated places, and American Indian lands (including off-reservation trust lands), as well as census tract/BNA numbers and boundaries and census block numbers (including alphabetic suffixes). If the BAS certifier or liaison determined that there were map errors, he/she marked a copy of the 1990 BAS or postcensus local review map and sent the updated map to the local MDO or RCC for followup.

The Census Bureau sent the Postcensus Local Review Listings, Form D-77, which showed the number of HU's and the GQ population (but not the household population) at the block level, to the RCC's, which mailed them to the GU's at the end of August 1990. The DOD was responsible for generating these counts based upon the ACF and the data capture files (DCF's). A summary page provided the number of HU's, GQ population, number of vacant units, and the total population for the GU and all dependent subgovernmental levels. The block listing sheet showed the HU and GQ population counts at the census block level, and the HU and GQ population along with the vacant-unit totals for the census tracts/BNA's. GU's with a population of 250,000 or more could request their postcensus listings on computer tape rather than paper; the DUSD had four tape formats from which to choose. The local MDO received paper copies for all its GU's for reference purposes.

GU's had 15 working days from the receipt of their listings to respond to the local MDO or RCC. The RCC was

the point of contact for some of the larger GU's. GU officials were instructed (and were expected) to have completed all preliminary work prior to the receipt of the listings. GU's could challenge only the block-level housing or group quarters counts. The vacant-unit count and the total population counts were only for informational purposes. If the liaisons identified differences between the local block estimates and the census block counts, they were instructed to complete Form D-74B, Postcensus Local Review Response, and return it along with documentation and a cover letter on official stationery signed by the CE/HEO.

After the MDO received the GU letters and forms D-74B, the DOM reviewed each entry, checking the documentation. Tax assessment and utility connection records, as well as address lists and locally conducted canvasses, were all considered acceptable forms of documentation. If these were unacceptable, the DOM sent the GU a letter explaining the documentation problem. If acceptable, the DOM forwarded form D-74B to the AMEDP for keying into the CCS, where the discrepancies were ranked with the largest positive differences in descending order. Originally, the Census Bureau planned to recanvass at least one block and up to 2 percent of the HU's within the GU area, starting with the block with the largest positive difference. Census Bureau enumerators did the recanvassing and identified any additional HU's that existed on April 1, 1990. Enumerators used Form D-111A, Address Listing, which contained all the addresses in all blocks within ARA's where blocks required recanvassing. In suffixed blocks (blocks that had been split during the block split operation), enumerators investigated whether the living quarters within the block had been assigned and/or map spotted correctly in relation to the block split maps. At the conclusion of the recanvass, the AMFO checked form D-111A for any added or duplicate listings and reviewed questionnaires for correct and complete entries. Clerks submitted a Form D-378, ACF Maintenance Record, to the ACF maintenance facility in the Baltimore PO for all adds, deletes, and transfers. At the conclusion of postcensus local review, all materials used to complete the census were sent to the servicing PO.

Although the time for responding expired on September 24, the Bureau accepted responses after the deadline through October 5, 1990. Responses were received from 9,847 GU's (about 25 percent of the GU's nationally), including all of the 51 largest cities in the country. Additional funds were available for further recanvassing, and the RCC's reallocated remaining funds throughout their regions as they deemed necessary. With funds in hand, on October 5, 1990, the Bureau decided to recanvass all challenged blocks where the local count was higher by two or more units or lower by more than five units and any blocks with group-quarters challenges. As a result, the recanvass covered blocks containing about 5.5 million HU's, or about 5 percent of all units. This additional workload prolonged the time it took for the recanvass, which therefore was not completed until November 16. In

November/December, replies were sent to all responding GU's, showing the revised/current block counts for the blocks that were challenged. The postcensus local review program became a media event, but with the extensive recanvass, most GU's concerns were addressed.

## SPECIALIZED ENUMERATION PROCEDURES

### Introduction

As part of its effort to collect information about all people within the scope of the decennial census, the Census Bureau developed a number of procedures for persons who lived in hard-to-enumerate areas, such as the remote parts of Alaska, the large areas of apparently abandoned buildings that exist in some cities, and some public housing projects. In summary, by reason of their official status, transient nature, unusual geography, and/or socioeconomic conditions, people needed to be enumerated in ways that varied from the norm for census households.

### Alaskan Remote Areas

There were several methods for covering the many and varied types of enumeration areas in the State of Alaska. The two largest cities, Anchorage and Fairbanks (and their vicinities), were designated as mailout/mailback (MO/MB) areas due to the concentrated populations and existence of city delivery postal service. (For the 1980 census, all of Alaska was enumerated using conventional procedures.) The rest of Alaska was enumerated by the same L/E procedures used in the sparsely populated areas of the lower 48 States.

The unusual feature of the 1990 Alaska enumeration plan was the treatment of outlying or remote areas. Most of these settlements, located throughout the State, were accessible only by small-engine airplane, snowmobile, four-wheel-drive vehicle, dogsled, or a combination of these; roads rarely existed to link the widely scattered settlements, except for the Southeast Fairbanks Census Area. These settlements ranged in population from a few people to several hundred persons, with a few larger places of 2,000 persons or more. The timing of the MO/MB and the group quarters operations in the main areas of Alaska were the same as in the other States. Enumeration of the remote areas began in mid-February, but all census questions were asked in relation to Census Day (April 1, 1990).<sup>25</sup> Anchorage was the site of the only DO, but there were satellite offices in Fairbanks and Juneau. A special field supervisory position in the DO was created for an AMFO-Remote, whose responsibility was to oversee remote-area enumeration. The Seattle RCC was responsible for the Alaska enumeration.

<sup>25</sup>If a birth was expected before April 1, the enumerator left a "Were You Counted?" Form D-25, for the respondent to complete and mail in for the new arrival.

The Bureau established the original Alaska pay rates at \$6.75 to \$17.50 per hour (see table 5, p. 23), but noting the high cost of living there and a need to boost the recruiting effort, the Seattle RCC requested, and headquarters granted, an increase for remote areas only, with a 25-percent cost-of-living adjustment (COLA). This allowed enumerators there to earn \$10 per hour. They also could earn enumeration bonuses of \$50 (plus COLA) for 25-49 completed cases and \$100 for 50 or more completed cases per assignment. Enumeration incentives of \$200 were offered to team leaders (crew leaders) and \$400 for FOS's upon completion of their assignments in remote areas.

The Bureau used a team concept in outlying areas, where a team leader, rather than a crew leader, directly supervised or worked with one or more enumerators in each of three villages and might travel to some assigned settlements twice. The enumeration program, called Outlying Areas L/E, covered the northern boroughs of North Slope and Northwest Arctic, the central area known as the Yukon-Koyukuk Census Area, and the western areas (Nome, Wade Hampton, Bethel, and Dillingham Census Areas, Bristol Bay and Peninsula Boroughs, and the Aleutian Islands). Southeast Fairbanks Census Area, Kodiak Island Borough, and parts of the southeastern Alaskan panhandle also were enumerated by this procedure. Sampling here was 1 in 2, except that places with more than 2,500 inhabitants (based on 1980 census figures) were sampled using a 1-in-6 pattern. There were some address register problems discovered during the early enumeration in Alaska, because some of the ARA's with 1-in-2 sampling rates had received address registers that indicated a 1-in-6 sampling pattern. New address registers were shipped from DPD. Over one-half of the ARA's in the remote areas were sampled at the 1-in-2 rate.

Enumeration of the remote areas began in mid-February 1990 in four "waves," organized by regions of the State. The special timing permitted travel (for the first three waves) to these areas during the period when conditions were most favorable; for example, the ground and rivers were still frozen so that planes could fly in and out, and the residents were still at home. Once the spring thaw (or "breakup," as it is known locally) began, travel to some of these areas was difficult or impossible, and the people would leave home to fish and hunt. Enumerators had to finish their work before then or they would miss a large part of the population. Wave 1 enumeration began on February 12th, wave 2 on February 26th, wave 3 on March 12th, and wave 4 on March 26th.

In each Alaska Native village (ANV), settlement, and incorporated place in the remote areas, the village leaders designated a local resident as the liaison to cooperate with the team leader and the enumerator during the enumeration and local review. Prior to the enumeration, a census community awareness specialist (CCAS) visited each settlement and worked with the liaison, selected the enumerator(s), and gained the cooperation of the local officials and community. The CCAS played an important role in collecting information and establishing good relationships

with the ANV's leadership and communities. CCAS's visited each village between April 1989 and January 1990 and developed profiles of ANV's, remote campsites, and so forth. The profiles included names of key contact persons (such as the village leaders), special logistics/travel arrangements, names of potential enumerators, and lodging and eating information and establishments. During their visits, the CCAS's also encouraged participation in the census, assisted in the selection of qualified enumerator(s), and trained the local review liaison (usually the highest elected official (HEO)). The Seattle RCC hired a team of four CCAS's who traveled to all the ANV's in the State to accomplish this work. These and other outreach programs enabled the Census Bureau to establish contacts in all parts of the State and improved the working relationship between the local population and Bureau personnel. As initially planned, the team leader met the community liaison during the first of two visits to a settlement, conducted on-the-job (OJT) training, met and delivered enumeration materials to the enumerator, and accompanied him/her during the first part of the enumeration to see if it was being done properly. If the enumerator worked well on his/her own, the team leader traveled to the next settlement, but if there were problems, the team leader looked for another enumerator or did the work (using the enumerator as an interpreter) himself or herself. Enumerators used the enumerator-friendly questionnaire (EFQ) at each HU and spotted the location of each HU on the ARA map.

Team leaders were to make a second visit to collect and review enumeration materials, complete any outstanding work, and conduct a vacancy check and local review. In some smaller settlements, where it was not cost effective to make two visits, the team leader and enumerator split the work and completed the enumeration and followup activities. Frequently, team leaders were unable to identify enumerators but employed village residents as guides. In these instances, only one visit was made to the village and counts were reviewed with the HEO before departing.

In all, 423 ARA's, with 4,669 blocks and 29,661 HU's, were enumerated in Alaska's remote areas. There were approximately 83,000 persons counted using these procedures. The original plan to recruit team leaders from local communities was largely unsuccessful, and the majority of the team leaders came from Anchorage. The enumeration was completed on May 18, 1990, about 1 week past schedule.

The DO hired special-place team leaders for the remote areas, designated a SPOS for outlying areas, and had two locally hired census military representatives. Most settlements in remote areas had no or few special places (see p. 48). The CCAS's attempted to identify additional special places during their visits to the settlements. The team leader enumerated special places if the settlement had no more than two of them. The two military representatives from the DO visited all 23 bases in the State; of these, 14 were located in remote areas. The Armed Forces were responsible for enumerating all military personnel (see p. 50 ff.), but the census representatives enumerated all

individual HU's on the bases and collected the completed military census reports (MCR's) before departing.

## Urban Areas

The urban enumeration program had two basic components—urban update/leave (UU/L) and urban update/enumerate (UU/E). The Bureau used the UU/L methodology in selected type 1 DO's to enumerate census blocks that contained mostly public housing developments. UU/E procedures, applicable to both type 1 and type 2 DO's, were used in selected cities to enumerate whole census blocks that consisted almost entirely of boarded-up buildings.

**Urban update/leave (UU/L)**—Field Division instructed RCC's to identify whole census blocks of public housing developments for UU/L procedures. The two major criteria for accepting UU/L areas were that targeted cities had to have at least 5,000 housing units in the workload and the housing developments had to comprise whole blocks. RCC's had to send lists of these to headquarters by April 30, 1988. The RCC's were given another opportunity to update their workload lists in April and May 1989, but all information had to reach the Decennial Operations Division (DOD) by August 1, 1989. The DOD flagged the affected UU/L blocks on the ACF and transmitted this information to the DO's CCF via the ACF/CCF refresher tape update (see p. 40).

One of the major features of the UU/L operation was the promotional activity before the enumeration. (See ch. 5.) These promotional programs publicized the census and were designed to foster the understanding that census information was confidential. Two weeks before the start of the operation, enumerators were hired from the targeted developments and trained by the CAPP staffs to do such things as hang posters in area buildings, distribute "Answer the Census" pamphlets to respondents, and attend various community functions and tenant association meetings. If necessary, the CCAS established temporary questionnaire assistance operations in the recreation areas of the apartment complexes. The CAPP staffs also provided additional census outreach to areas adjacent to UU/L areas.

Using the CCF, the DO printed form D-105, UU/L address registers, and requested the appropriate precensus maps containing blocks affected by the urban enumeration. Enumerators used the address registers to add, delete, and transfer addresses; correct address and geographic information about the UU/L units; and hand deliver census questionnaires to UU/L households. DO's were encouraged to hire residents of public housing developments as enumerators. Respondents were asked to mail questionnaires back to the PO's. Once questionnaires were received in the PO's, they followed the same processing flow as other type 1 mailback forms (see ch. 7).



In all, approximately 210,000 HU's were enumerated during the UU/L operation in 4 of the 13 RCC regions. Philadelphia had the largest UU/L workload, with Chicago second.

**Urban update/enumerate (UU/E)**—The UU/E methodology was used in selected cities to enumerate whole pre-identified census blocks of boarded-up units. These procedures were specific to type 1 and type 2 DO's. Workloads were identified by the RCC's during the same time frame as the UU/L units. Most DO's used available field staff because of the small UU/E workloads.

The DOD flagged the UU/E blocks on the ACF through the weekly refresher tapes sent to the affected DO's, and the DO's printed special UU/E address registers, form D-105, for those blocks. Enumerators canvassed their areas, returned completed questionnaires for any occupied and vacant units, and annotated questionnaires for all deleted units. Most units in UU/E areas were vacant or deleted units. Questionnaires followed the same processing route as regular questionnaires, except that UU/E questionnaires were excluded from telephone followup, NRFU, and the vacant/delete check portion of the field followup operation. The UU/E operation, conducted only in the New York and Detroit RCC's, covered approximately 165 blocks containing an estimated 4,747 HU's.

## SPECIAL PLACES

### Introduction

These procedures dealt with people who lived in "special places" that had group housing, such as prisons, boarding and rooming houses, hospitals and nursing homes, convents, monasteries, orphanages, residential care facilities, and college and university dormitories, and with transient persons who lived in campgrounds or marinas, or traveled with carnivals, fairs, and circuses. Unique procedures were implemented to enumerate military personnel living on military installations and aboard U.S. Navy and Coast Guard vessels and people aboard maritime (civilian) vessels. The 1990 census was the first census to have an in-depth enumeration of selected components of the homeless population at shelters, subsidized hotels and motels, and city-designated street locations, as well as commercial places (such as bus, subway, and train stations) that had been canvassed in 1980. The operational title used to describe the enumeration of places and areas described above was "special place (SP) operations."

Special place enumeration, with office and field staffs assigned for that purpose, allowed the Bureau to (1) count within a short time period large numbers of people, and (2) collect data for persons in special places without overburdening respondents. The following sections describe various aspects of this complex operation.

For the 1990 census, special places included all the types mentioned above. As a further definition (as in 1980), a single-family home or apartment, rooming/boarding house,

or similar type of residential unit occupied by 10 or more unrelated persons was considered to be a group quarters (GQ) rather than a housing unit (HU) and was included in the special place classification. Identified group quarters, even when resembling housing units, were not included in the housing inventory for census purposes; only population data were collected there.

There were three types of living arrangements that might be located at special places: housing units, institutional GQ's, and noninstitutional GQ's. Not all special places contained all three types, but any combination of the three could be present at any particular special place. A housing unit generally was a house, apartment, single room, collection of rooms, or a mobile home occupied as separate living quarters (or intended as such) by less than 10 persons. Institutional group quarters were occupied by one or more persons under custody or care, such as children in an orphanage, patients in a nursing home or in a chronic-disease ward or other institution, or prisoners in a penitentiary. Quarters occupied by staff members, with or without families, were considered housing units if they met the criteria of separateness and direct access. If not, they were considered noninstitutional GQ's—nurses' dormitories, etc. Noninstitutional GQ's were all other group quarters not classified as institutional.

In 1987, the DPLD acquired lists, directories, and tapes of special places through private organizations, administrative records of government agencies, and other sources for creating the special-place inventory. All these acquisitions were keyed into a computer file by the DOD which created the special-place file used to print the Special Place Listing, Form D-329, for 1988 prelist, precavass (in TAR areas), and 1989 prelist operations, all of which added special places to the file. During the census itself, enumerators listed any SP's not previously listed on special pages of the address registers for subsequent handling by the SP staffs. The final computer-generated copy of form D-329 for the SP prelist operation contained most of the identified SP's nationwide, except those places identified during the 1989 prelist and L/E operations. Each DO received two versions of form D-329 for its DO area, one in alphabetic order and the other in ascending geographic (ARA/block number) order. The DO's transcribed adds and corrections to both versions.

Each DO in the United States had a staff to which it assigned SP operations—a special place operations supervisor (SPOS) and a supervisory office clerk (SOC), several part-time clerks, and an appropriate number of crew leaders and enumerators. Each of the 13 RCC's had an SP regional technician to support DO operations.

The Special Place Section of the Procedures and Training Branch, part of FLD at headquarters, assisted in the development of procedures and training based on technical specifications from the various divisions involved in the census. This staff wrote the necessary manuals, training guides, self-studies, and workbooks, modifying them as needed based upon experience in the pretests and the dress rehearsal.

## Special Place Prelist (SPP)

Approximately 2 to 3 weeks before the start of SPP, the SPOS and staff in each DO conducted a "local knowledge update," the primary purpose of which was to identify missing SP's, and geocode and add them to form D-329. The SPOS and staff used the yellow pages from their local phone book and their knowledge of the local areas to add SP's and to assign geocodes and ID numbers to them. The staff also contacted any questionable form D-329 entry to determine if it represented a legitimate special place.

Around January 5, 1990, DO clerks addressed SP advance letters (form D-30(L)) for mailing to all listings on the updated form D-329. This letter informed the SP that an enumerator would visit soon to obtain some basic information. During the next 2 weeks, the SPOS determined the number of crew leaders and enumerators needed for the SPP and conducted the 2-day verbatim training for crew leaders. Each crew leader was responsible for training his/her enumerators, also using verbatim training materials.

During SPP (January 17-26), enumerators visited SP's and completed a partially filled Form D-351, Special Place Prelist Record. During the visit, the enumerator determined that the SP existed, verified and corrected (if necessary) the SP address, and classified the living quarters associated with the place as HU's, GQ's, a T-Night place<sup>26</sup>, or an S-Night place.<sup>27</sup> For all living quarters identified at SP's, the enumerator completed a form D-351(HU) for housing units and/or a form D-351(GQ) for group quarters. These forms accommodated three addresses, so enumerators could continue listing HU's and GQ's, although a new form was started for each new special place. The SPP enumerator classified the GQ according to a 10-page group quarters code list that categorized all possible types of GQ's and had different codes for institutional and/or noninstitutional GQ's. Enumerators also entered address corrections and population estimates, established a GQ contact for later operations, verified and/or assigned geocode information, and assigned a map spot number (not in TAR ARA's) and spotted the location of the GQ's on the census map for later reference. The SPOS conducted quality-assurance followup by telephoning the first two SP's visited by the enumerator to verify that the information collected was both complete and accurate. If that was acceptable, subsequent followup was limited to every fourth SP.

DO's sent forms D-351(HU) and D-351(GQ) to the Baltimore PO for ACF maintenance keying. The DOD assigned a unique ID number for each GQ within the DO, and transmitted these data on the ACF/CCF interface

<sup>26</sup>T-Night places were SP's that were so classified due to their transient nature, and included campgrounds, marinas, YWCA/YMCA's carnivals, circuses, and fairs open on March 31, 1990. The places were enumerated during a separate T-Night operation (see p. 53).

<sup>27</sup>S-Night places included all homeless shelters, and those hotels and motels that charged \$12 or less per night (excluding taxes). These places were enumerated during the shelter and street night enumeration on March 20 and 21, 1990 (see p. 52).

tape. The DO printed the Group Quarters Listing, Form D-324, that listed all the GQ's with their ID numbers for GQ enumeration. The SPOS and clerical staffs transcribed the ID numbers from form D-324 onto form D-351(GQ) forms and then prepared the Group Quarters Enumeration Records, Form D-352. All HU's identified during SPP were added to the DO ACF file. Most of these units were mailed a questionnaire during the regular mailout; units not included in the regular mailout were enumerated during subsequent operations. In L/E and U/L areas, DO's had to transcribe HU information onto the address registers so enumerators could enumerate these HU's during their canvassing.

In addition to the regular questionnaires used to enumerate households during the census, the Bureau used Form D-20A (short form) and D-20B (long form) Individual Census Report—commonly referred to as the ICR—to enumerate persons living in GQ's. There were Spanish versions of both forms. (The 1980 census had one ICR, form D-20, that was used for both the long and short form.) The ICR contained only population questions, since the Bureau did not require housing information about group quarters. SP operations used the ICR for all persons in group quarters and those enumerated during T-Night and S-Night. There were other specialized enumeration questionnaires, which included the Military Census Report, Form D-21, (MCR)—used to enumerate service personnel at military bases throughout the United States, and the Shipboard Census Report, Form D-23, (SCR)—for military and maritime (civilian) personnel aboard ships (see below).

## Group Quarters Enumeration (GQ)

GQ enumeration began the day after Census Day and was scheduled to last 2 weeks. This covered approximately 142,000 group quarters and 6.6 million people. The SPOS and staff completed the GQ Enumeration Record, Form D-352, using the GQ Listing, Form D-324. The enumerator used form D-352 to record enumeration results for each GQ and referred to this form for any special instructions. The SPOS determined the workload for each enumerator (approximately 640 persons) and made assignments.

In preparation for GQ enumeration, the DO mailed each GQ a Special Place Poster, Form D-22, announcing that the census would use special procedures to enumerate the persons staying there, and asked that the poster be displayed so residents would know this.

Enumerators visited each assigned GQ, listed the names of the people staying there on the Group Quarters Sampling Register, Form D-116, which indicated which persons would receive the long-form ICR. Enumerators prepared ICR's by entering the DO and GQ identification numbers on them. Each ICR was inserted into an ICR envelope, form D-40, which had the resident's name, room number, and time and point-of-collection information entered on the front. The enumerator returned a day or two later to pick up the filled ICR's and interview respondents that had not completed theirs. The crew leaders and the SPOS reviewed the enumerators' work.



Persons at certain types of noninstitutional GQ's were allowed to claim a usual home elsewhere (UHE). Respondents simply checked a box on the front of the ICR opposite the line, "A person away from your home for short time, such as on a vacation or business trip?" and printed their home address on the front of the ICR in the space provided. These UHE ICR's were eventually sent through a search/match operation in the PO, where clerks would try to determine if the respondent was already enumerated at the claimed regular home address. If so, the ICR was destroyed, but if not, the person was added to the home questionnaire.

The SPOS and clerical staff divided each GQ's ICR's into groups—those with an acceptable UHE declaration and those without. The SPOS attempted to geocode those ICR's with acceptable UHE addresses located within the DO's boundaries. The SPOS bundled the non-UHE ICR's in one group and placed them with their appropriate form D-352 ready for shipping to the PO for processing. ICR's, unlike other census questionnaires, were manually checked in and out of the DO. All ICR's were held until the completion of the SP operations. When these ICR's arrived at the PO, they were separated; those with acceptable UHE addresses were sent to the search/match unit, while the remaining ICR's were sent to keying, since ICR's were not machine readable. (Refer to ch. 7 for further details on questionnaire and ICR processing.)

**Self-enumerating group quarters**—People in charge of certain GQ's could request that they "self-enumerate" (i.e., that the GQ's census be an internal operation) for the safety of the enumerator or for the benefit of the persons living there. The two most common self-enumerating GQ's were hospitals and prisons. Staffs from the self-enumerating GQ's, with the assistance of a crew leader, filled and/or collected the forms. Shelters for abused women and children were self-enumerated and were geocoded to the DO address to protect their actual locations from being revealed. The procedures for self-enumeration were identical to the usual ones for GQ's and were carried out during the same time period. The crew leader trained and swore in the self-enumerating GQ's personnel, left the required forms and manual (form D-578), and returned in a few days to collect the completed work. The crew leader reviewed the returns and delivered the enumeration materials to the SPOS.

### **Military Base and Vessel Enumeration**

In military situations, the Bureau found it administratively and practically feasible to have personnel of that place enumerate its residents. In these so-called "self-enumerating places," the military commanders designated employees to work on the census. The local DO's SPOS or crew leader served as liaison and monitored the operation, seeing to it that sufficient materials were provided, records properly kept, and completed enumeration materials returned.

Military enumeration covered personnel who were assigned to land bases and aboard vessels, including Coast Guard stations and ships. The census used the unit-control method for all branches of the service (except the Coast Guard, which used the unit roster as the basis for keeping track of the process) to enumerate the land-based military and ensure that everyone assigned to operating units on the base was accounted for. The barracks-control method was used to enumerate the Coast Guard, since its administrative records were kept in this fashion. Military personnel completed Military Census Reports (MCR), Form D-21, on which they could claim a UHE. The Census Bureau used regular enumeration procedures analogous to the local area to enumerate the family housing units on military bases.

Various divisions at headquarters, along with liaisons from the Department of Defense and the Department of Transportation, planned the military enumeration through a series of meetings that began in 1985. The two departments provided information required for the census—for example, military housing unit (MHU) address lists, lists of bases, and lists of vessels and their associated home ports. A letter from the Secretary of Commerce to the Secretaries of Defense and Transportation described the military enumeration and provided a schedule for all activities involving their personnel. This document, endorsed and transmitted to the liaisons by the two Secretaries, authorized the liaisons to have the bases and vessels cooperate with the Census Bureau in all activities related to the enumeration. During these meetings, the Geography Division (GEO) at headquarters discussed the identification of installations with housing (MHU's) for at least 50 people and the acquisition of maps. The GEO also requested information about bases inactivated since the 1980 census. Most bases, regardless of size and street pattern, were represented by a single census block number on the census maps.

**Military base enumeration**—After the DPLD had acquired the lists of MHU's for each base in January 1989, the GEO provided the geocodes in non-L/E areas for the larger bases, while the local DO geocoded the MHU's for smaller bases. The DPLD provided the DO's with small-base lists and type 3 DO's with MHU lists for bases in L/E areas. DO's added these MHU's in non-L/E areas to the DO address universe by completing Form D-351(HU), Special Place Housing Unit Address Sheets, and sending them to the ACF maintenance facility in the Baltimore PO. The L/E enumerators used these MHU lists to check their actual listing work.

In the detailed procedures sent to the bases earlier in 1989, the Census Bureau requested that each have a senior commissioned officer appointed to be the project officer for the military enumeration. The SPOS contacted each project officer in the DO area in December 1989 to arrange a meeting. During this meeting, the SPOS described the enumeration process and the personnel requirements,

obtained a list of military GQ's (barracks, bachelor officers' quarters (BOQ), etc.), map spotted all military GQ's, updated the MHU list, and left a Military Installations—Manual for Self-Enumeration, Form D-576.

In March 1990, the census representative for military installations from the local DO met with the project officer to partially complete the Military Installation Units List, Form D-124 (which listed the name of the unit, the unit representative, and estimates of the unit population), arranged training sessions for personnel working on the census, and requested a list of personnel assigned to the base, by operating unit. For the enumeration, the project officer appointed a unit representative for each military unit and a personnel enumeration clerk for every 100 persons.

A few days before Census Day, the census representative conducted the training sessions; swore in the project officer, unit representatives, and clerks; and distributed the materials required for the enumeration. Each unit representative received a D-576 manual. The project officer distributed a list of personnel to each unit representative, who determined if there were changes to this list. After close review, the project officer provided each unit representative with the MCR's for his/her unit. The unit representative distributed an MCR to each person in the unit to complete by April 2, 1990. Most personnel answered seven questions, while one in six completed the entire MCR. The last four digits of the person's social security number (SSN) determined whether he/she fell into the sample. If the last four digits of the person's SSN were 0000 to 8332, he/she did not fill pages 3 through 7 of the MCR; if the last four digits were 8333 to 9999, the entire MCR was to be completed. The unit representatives collected and reviewed completed MCR's and followed up for incomplete and/or missing information. Using administrative records, unit representatives filled out MCR's for any persons who were not able to, or who were away from their active-duty assignments.

The project officer received all the enumeration materials from the unit representatives and followed up on units that had not responded. Clerks who worked for the project officer counted the MCR's for each unit, resolved any differences, and conducted a final review of the MCR's. The project officer completed the final check-in process and gave all materials to the census representative by April 9, 1990. The census representative checked the returns and submitted all enumeration materials to the SPOS. The MCR's were separated by address type (HU or GQ) by unit and a Form D-352, Group Quarters Enumeration Record, accompanied each GQ stack. The SPOS and DO staffs reviewed the household-addressed MCR's and geocoded UHE's located in their DO area. These MCR's were then sent to the PO with the rest of the GQ enumeration forms. The enumeration of military bases went very well, although there were some not completed until July, for various reasons including base access, staff problems, and proper notification of military and civilian staffs. The estimated workload for the military base enumeration was 900 bases with an estimated population of 2 million.

**Military vessel enumeration**—The Census Bureau received lists of Navy and Coast Guard vessels, their assigned home ports, mailing addresses, and estimates of personnel from the Departments of Defense and Transportation in July 1989. The GEO geocoded the lists to their appropriate 1990 census tabulation geography. In two home ports that contained multiple port sites, the RO's contacted the port captains on April 2, 1990, to determine the specific location of each vessel assigned to and docked in its home port, and transmitted that information to the GEO to make sure these vessels were assigned the proper census geography.

The DPD assembled the enumeration kits and subsequently mailed each vessel its enumeration materials and manuals. The commanding officer appointed a project officer and division representatives for the vessel enumeration. The project officer completed the Acknowledgment of Receipt of Materials, Form D-46, which notified the Baltimore PO that the vessel had received its enumeration kit materials and requested additional quantities, if needed. The project officer distributed Shipboard Census Reports (SCR's), Form D-23, to personnel in their divisions. The same sampling procedure used for land bases applied to shipboard personnel. The division representatives instructed each person to complete the SCR, seal the form, and return it to them by April 1. The division representatives checked off the receipt of the SCR's against their lists of personnel. When completed, the division representatives turned in the SCR's to the project officer, who verified the returns and checked on any differences. The project officer mailed the enumeration materials to the Baltimore PO, which served as a clearinghouse. The workload for the military vessel enumeration was 825 military vessels with approximately 270,000 personnel.

The clearinghouse received the completed forms for each vessel, checked in the materials against a control list, and notified the DPLD of any vessel that did not respond by late April 1990, so that staff could ask the military to contact the vessel(s). It sent forms to ACF maintenance to get a group quarters ID for each vessel, separated forms by UHE/non-UHE, and then transmitted each vessel's forms to the PO that serviced the vessel's home port for further processing.

**Maritime vessel enumeration**—Approximately 850 Maritime Administration (MARAD) cargo ships carried crews and/or passengers, all of whom were enumerated using SCR's and had the option of claiming a UHE. The workload for the maritime vessel enumeration was approximately 25,000 people. The kit preparation and processing were similar to that of military vessels. The 1990 census enumeration rules for maritime vessels were as follows:

**Status as of Census Day:** The census counted maritime crews and passengers of U.S. flag vessels in various ways:

**If the vessel was—**

Docked or moored in U.S.  
 Docked or moored in foreign port  
 Sailing, U.S. port to U.S. port  
 Sailing, U.S. to foreign port  
 Sailing, foreign to U.S. port  
 Sailing, foreign to foreign port

**It was counted—**

U.S. port  
 Overseas  
 Port of departure  
 U.S. port  
 U.S. port  
 Overseas

**Shelter and Street Night (S-Night)**

S-Night was an operation designed to count persons living in pre-identified public shelters (including shelters for abused women) and places of commerce such as bus and train stations, and persons visible on the streets during the early morning hours. Local governments were responsible for identifying locations where people stayed. S-Night enumeration sites also included all pre-identified private emergency shelters, abandoned buildings, street blocks, and any of the aforementioned sites found during local-knowledge update by the local DO staffs. The operation also included all hotels/motels costing \$12 a night or less (excluding taxes), hotels and motels used entirely to shelter homeless (regardless of cost), and pre-identified rooms in hotels/motels (subsidized units) used for homeless persons and families. No one enumerated during S-Night was asked about a usual residence elsewhere.

In September, the RCC's mailed a letter, form D-33(L), to the approximately 39,000 functioning governmental units (GU's) throughout the United States requesting officials to identify all possible S-Night locations, and return the lists to the RCC by October 16, 1989, so these sites would be part of the SPP operation. The letters emphasized the importance of night localities and were sent certified mail, return receipt requested, over the regional director's signature. RCC staff made and documented followup calls to all nonresponding GU's with over 50,000 population. Some larger cities were granted extensions until January 10, 1990. There were problems getting timely responses from some of the cities and some lists were incomplete. DO staffs had to create lists for any GU that failed to respond. RCC staffs unduplicated lists resulting from jurisdictional overlap; the DO's clerically matched the local GU lists to the D-329 and geocoded and added any new SP's to the D-329. The DO prepared a form D-351 for all newly added places so the new locations would be part of the SPP operation.

DO staffs filled out a Form D-117, S-Night Enumeration Record, for each S-Night site and called each shelter, hotel, and motel to establish a contact person and to inform the operator how the enumeration would be done. Additional information, such as an estimate of the number of homeless sleeping at the shelter, requests for self-enumeration, the availability of administrative records to assist enumerators with vital information, the closing time of the shelter, specific room numbers of subsidized units, and any special enumeration instructions, were gathered during these phone conversations. Clerks would record this information on form D-117, so enumerators had this information in the field.

The S-Night operation and training was divided into two parts: Phase 1 focused on enumerating persons in shelters, subsidized units at hotels/motels, and low-cost hotels/motels. Phase 2 was for street locations, "commerce places," and abandoned buildings. Training was specialized, depending upon the phase to which the enumerator was assigned. Phase 1 training lasted about 6 hours and phase 2 training, 4 hours. Training for phase 1 covered more enumeration details, since enumerators were required to sample the respondents (1 in 6) and thus needed to know sampling and long-form ICR interviewing. Phase 2 concentrated on enumeration procedures and safety information, since enumerators would be on the streets late at night. There were two training sessions provided for each phase, one session in the afternoon of March 19 and the other in the evening of March 19. The evening sessions were to accommodate the large numbers of volunteers expected to take part in S-Night. It was felt that more persons would volunteer if they could be trained at night, thus avoiding taking any time off from their regular jobs. Homeless persons as well as interested professionals were encouraged to participate. To "sensitize" field workers about homeless people and their problems, a short film, "Homeless in America," was scheduled to be shown to all enumerators and crew leaders before they went to the field. Immediately before each phase's enumeration began, crew leaders reviewed safety tips with all enumerators.

Enumerators were paid the Federal minimum wage (\$3.80) for their training time and their full hourly wage (see p. 23) for the actual enumeration work. Upon satisfactory completion of their S-Night assignments, enumerators and crew leaders received a \$50.00 supplementary payment.

Enumeration for phase 1 began at 6:00 p.m. on March 20, 1990, and lasted until midnight. Family shelters and subsidized units were enumerated first, then the remainder of the shelters and low-cost hotels/motels. To avoid any disruption in hotels/motels, the enumeration had to be completed by 10 p.m., or it was continued the next morning. Enumerators were instructed not to wake any sleeping person, but to record age, race, and gender information by observation for all persons who were sleeping, refused to respond, and/or were unable to respond to questions. Long- and short-form ICR's were left at the shelter for any residents that were working at the time of the enumeration. These ICR's were inserted into envelopes and arranged in order of the remaining spaces on the sampling register. Shelter operators were instructed to pass out the forms to late arrivals in the order in which they were provided. DO staff picked up these forms the next day. Enumerators asked respondents at family shelters a special question—the number of children under the age of 15 present with them. Enumerators counted only this number of children (regardless of relationship), not the number of children they had.

Phase 2, street and "commerce place" enumeration, began at 2 a.m. and lasted until 4 a.m. Between 2 and 4 a.m., enumerators visited various assigned street locations, parks, overpasses, and commerce places to look for

people and enumerate them on short-form ICR's. No sample data (only short-form ICR's were used) were taken during phase 2. In selected cities, enumerators also rotated positions outside selected abandoned buildings until 8 a.m. to determine if any persons were staying inside and to enumerate them as they left. Enumeration teams of two (sometimes three for safety) walked their assigned areas and enumerated all visible street people, other than police, persons in uniform, or those engaged in employment or obvious money-making activities (other than begging and panhandling). As in phase 1, no one was to be awakened. Only in the most dangerous areas were enumerators allowed to canvass their areas by car.

Both phase 1 and 2 enumerators had job aids that summarized their duties and procedures in the field, and selected RCC's provided them with vests or hats that identified them as census enumerators. Phase 2 enumerators were told to bring flashlights with them. S-Night enumerators experienced very few problems and in general were not bothered on the streets during S-Night. If staffing was insufficient and/or the enumeration could not be completed during the original time frame, RCC's had the authority to extend S-Night for selected DO's until March 22.

There was a great deal of local and national media attention and publicity for the S-Night operation. In some large cities, the media hindered the operation by converging on large shelters and commerce places, such as New York's Grand Central Station. Since enumerators were sworn to confidentiality, they were instructed not to conduct census interviews on camera or around reporters. This hampered the enumerators' ability to cover some places, although these were canvassed after the media had departed. There were some coverage problems, due mostly to incomplete location lists from the GU's. Operators of some S-Night locations refused to allow enumerators inside, so enumerators stayed outside and interviewed people as they arrived and departed. Some locations contained more people than expected and took two nights to enumerate. In some cities, locations were identified that were omitted on the lists provided to the Census Bureau; these sites were enumerated on March 21 and 22. In total, over 34,000 sites were canvassed during the S-Night operation and the count yielded approximately 178,000 persons counted in shelters and over 49,000 at various street locations.

### **Transient Night (T-Night)**

Transient night, commonly referred to as T-Night, was an operation designed to count persons of a highly transient nature. T-Night took place on Saturday afternoon and evening, March 31, 1990, between 4 p.m. and 10 p.m. T-Night enumerators visited and interviewed at YWCA's, YMCA's, youth hostels, commercial and public campgrounds, campgrounds at racetracks, fairs and carnivals, and marinas. Most "travel places" listed above (except fairs and carnivals) were included in SPP. Due to their

transient nature, fairs and carnivals had not been in the SPP inventory; these places were added and prelisted just prior to T-Night. Every person enumerated during T-Night had the opportunity to report a usual residence. Unlike 1980, motels/hotels were not included in the 1990 T-Night operation because previous tests had proven that the yield from these places was extremely low.

Clerks telephoned or visited all T-Night locations one week prior to March 31 to remind operators of the enumerator's visit. All T-Night enumerators were selected from personnel trained for GQ enumeration. All GQ enumerators that worked on T-Night had to complete a self-study and a T-Night review test. Enumerators then visiting each T-Night place assigned, met with the contact person to explain the purpose of the visit, offered Form D-31, Privacy Act Notice, answered any questions, and verified any information on the Form D-352, Group Quarters Enumeration Record. Form D-352 listed the place name, address, and specific enumeration information, such as the name of the contact person and number of persons to be enumerated. Using the proper type of ICR, the enumerator interviewed each person at the assigned location. There were approximately 13,000 T-Night sites nationwide.

## **ADDITIONAL COVERAGE IMPROVEMENT OPERATIONS**

### **Introduction**

In an effort to provide the most complete count as possible, the Census Bureau instituted a series of coverage improvement operations (in addition to the general ones already discussed) designed to address potential coverage discrepancies among selected geographic sections and demographic groups of the country. Most of these operations were carried out in all types of DO's, while some were confined to certain areas of the country. Table 10, on page 54, shows that these activities added about 5.4 million persons to the census counts, or about 2.2 percent of the total enumerated population. The following text describes the operations.

### **Were You Counted? (WYC) Campaign**

The WYC campaign identified and enumerated those persons who believed they or members of their household had not been included in the census. This campaign, in which everyone was given another opportunity to be counted, followed the conclusion of NRFU and L/E operations.

The census used both print and electronic media to publish the WYC form in various periodicals so that persons unsure of their enumeration status could complete the form and return it to the specified address. The electronic media publicized the telephone assistance phone numbers so would-be respondents could contact the census office and provide their personal and address information to enter on a WYC form.

**Table 10. Coverage Improvement Operations**

| Project   | Schedule 1990 | Population count (millions)* | Percent of enumerated population |
|---|---------------|------------------------------|----------------------------------|
| Residential population count at the end of primary data collection activities ..... | —             | 243.2                        | 97.8                             |
| Total population added from coverage improvement operations .....                   | —             | 5.4                          | 2.2                              |
| Vacant/delete check .....   | Jun-Aug       | 2.1                          | 0.8                              |
| "Were You Counted?" campaign ..   | Jun-Sept      | 0.2                          | 0.1                              |
| Parolees and probationers count check .....   | Sept-Dec      | 0.4                          | 0.2                              |
| Recanvass and postcensus local review .....   | Aug-Oct       | 0.3                          | 0.1                              |
| Miscellaneous** .....   | Jun-Dec       | 2.4                          | 1.0                              |
| Final residential population count..  | Dec 26        | 248.7                        | 100.0                            |

\*All numbers expressed as components of the final residential population count are estimates based on preliminary report data from census field office management information systems, or unedited data capture files. Final components of the count will not be known until comprehensive analyses are performed on the final edited census detail and supporting files.

\*\*This includes persons added during field followup (excluding persons added from conversions of vacant and nonexistent units) and other field and processing operations. It also includes some persons imputed for occupied households for which there was no person count. Some portion of the remaining adds in this category cannot be attributed to a specific operation without further review and evaluation.

Source: "Components of the Resident Population," presentation by Dr. Barbara Everitt Bryant, Director, Bureau of the Census, for the Subcommittee on Census and Population, Committee on Post Office and Civil Service, U.S. House of Representatives, February 21, 1991.

RCC and some DO staffs were responsible for negotiating with the local print media (major and local newspapers) to print the WYC form and/or print the information about the WYC operation. This form was published in 8 languages (including English), although the RCC's had reproducible copies of WYC form in 25 additional languages. These persons also negotiated with the local electronic media to carry public service messages (from June 11 to July 11) that included the local 800 numbers used by both the PO and type 2 and type 3 DO's.

After WYC forms were received by the PO's and type 2 and 3 DO's, clerks checked them to determine if the address on the WYC form was searchable. If the address was incomplete, clerks would attempt to contact the respondent for additional information. If the DO or PO clerks were unable to contact the respondent after three attempts, they did no further processing. Given searchable addresses and complete data, the forms were geocoded and sent to the PO's search/match unit.

There was a contingency plan established to identify both the misuse and large-scale reporting of erroneous information at the DO level. Under this plan, the Bureau could detect forms misuse by selecting a sample of WYC forms from targeted DO's and determining a yield rate by processing them through the search/match operation. If there was evidence of large-scale reporting of erroneous data for a particular DO, headquarters would instruct the

PO's not to capture the data for any WYC persons for that DO. There was some evidence that this happened in Detroit, MI, during the WYC campaign. After the city of Detroit received its preliminary census counts, local officials decided to "sweep" through areas where they thought the census had possibly missed some residents. City workers, not trained on census procedures, collected approximately 88,000 WYC forms. Following their DO review, census enumerators visited approximately 46,000 addresses to determine their actual census status. MDO 2403 (Detroit-West) remained open to complete this extended campaign. About 47,000 persons were added as a result of the Detroit WYC operation.

The WYC campaign was delayed in some areas because of a significant lag in completing NRFU in some RCC's. Originally scheduled to start on June 6, the operation was postponed 1 week, until June 11. The WYC operation continued until early November, although the phone contacts for questionnaire assistance were only extended through September 30. The Bureau received approximately 358,000 WYC forms, of which approximately 120,000 resulted in one or more persons being added to the census.

### Recanvass Operation

The recanvass was planned to improve coverage in specific areas where count review and other research indicated deficient housing counts. Recanvass was scheduled to begin in late July, and the last DO completed work in early October 1990. The exact timing was after field followup's final residual followup was complete and before postcensus local review (PCLR) recanvass began, i.e., between July 18 and October 12. In the overall plan, blocks included in the recanvass operation were not eligible to be recanvassed during PCLR recanvass.

Headquarters established a recanvass working group of representatives from each of the major divisions that worked on the census. The group's goal was to determine how the recanvass areas would be selected. The factors for specific areas included high growth (reflected in the number of building permits issued), inputs from count review and WYC programs, results from postal checks, and local-knowledge updates from RCC's and DO's. All areas of the country were eligible, regardless of the type of enumeration area. RCC's submitted lists of blocks from their DO's for recanvass targeting, and the working group defined guidelines to decide which areas would be included in recanvass.

The recanvass operation had two stages. During stage 1, field staffs systematically canvassed targeted areas/blocks and identified, listed, and where appropriate map spotted missing addresses that existed on Census Day. As needed, DO staff conducted a windshield check (rode in cars and noted areas where systematic recanvassing appeared necessary) before stage 1 canvassing began. Local-review listings were used for this stage because they included all adds identified from field followup. During



stage 2, enumerators obtained interviews at each added HU identified during the first stage. Enumerators had to determine that the HU existed on April 1; if it did not, the enumerator deleted it from the listing. Completed questionnaires were checked out of the CCF and shipped to the appropriate PO once the updated CCF reflected identification numbers supplied via ACF maintenance. Between late July and early October, the Census Bureau recanvassed over 500,000 blocks containing about 15 million HU's, or about 15 percent of all HU's.

### **Parolee/Probationer Program**

The Census Bureau identified persons on parole and probation as two population subgroups that could possibly be undercounted during the 1990 census. In an effort to avoid an undercount, the Bureau's DPLD developed the Parolee/Probationer Coverage Improvement Program (PPCIP). Its goal was to make certain that those persons on parole or probation as of April 1, 1990, in each State were enumerated, approximately 2.5 million persons nationwide.

Letters went to the Governors and heads of the various correction departments of each State and the District of Columbia describing the program and inviting their participation. For all interested States, the Bureau mailed the necessary enumeration materials and instructions.

The methodology called for each parole/probation officer to distribute a Parolee/Probationer Information Record, Form D-59B, to each assignee. This form requested the parolee/probationer to write in his/her Census Day address and some basic demographic data and return it to the parolee/probation officer in a sealed envelope. All forms were collected and returned to the PO in large preaddressed envelopes. These forms were sent through the search/match operation to determine if these persons were listed on regular census questionnaires for the Census Day addresses on the D-59B forms. Any not listed on the matched address questionnaire were added to it.

The PPCIP described above had a very low response rate, so the staff decided to expand the program by having census enumerators aid in the data collection. The expanded PPCIP targeted specific counties that would provide the greatest payoff in terms of coverage for this particular population group. The target counties included all those originally designated for type 1 DO's, counties in type 2 DO's that had a 1980 population of 100,000 or more and had a minority composition of at least 20 percent, and additional counties that the Field Division identified. The RCC's contacted the State heads of corrections, notified them of the Bureau's intention to continue the PPCIP, and asked for lists of parolees and probationers. RCC's provided DO's with all of the information they obtained from the State(s). DO's were responsible for visiting local or county departments of correction to obtain administrative lists that contained names, Census Day addresses, telephone numbers, sex, age, race/Hispanic origin, and marital status. The minimum requirement was name, address, and two demographic characteristics. The parole/probation

officers were asked to verify that the addresses provided were Census Day addresses. If the officers could not verify the addresses, DO's telephoned those parolees/probationers or confirmed them with other knowledgeable sources. DO clerks completed a form D-59B for each person with a verified Census Day address and forwarded this information to the servicing PO for the search/match operation. FLD completed interviewing on November 28 for all areas of the country except Massachusetts. Over 1.4 million PPCIP forms were processed in the PO's through the search/match operation, and about 412,000 of these resulted in a person being added to the census.

## **RE-ENUMERATION OF SELECTED HOUSEHOLDS**

### **Re-Enumeration of One-Person Households**

In late summer of 1990, allegations were made that during the closeout phase of nonresponse followup, enumerators in a few offices were recording households as one-person households without benefit of an interview; that is, they were fabricating data. The Bureau proceeded to select all offices so identified, as well as all offices with enumeration characteristics similar to these offices so identified, for re-enumeration. Twenty-four DO's reported a large number of one-person households when they closed out NRFU. All such one-person households were re-enumerated to verify that they contained no additional persons.

During the re-enumeration, headquarters decided that if the enumerator could not obtain any additional information about these households, DO clerks would complete a Form D-550P, Census Closeout Address Check (used during the NRFU and FF), for each address included on a list sent from DOD on the ACF/CCF update tapes. These D-550P's were sent to the Postal Service to be reviewed by the local postal carriers, who entered the estimated population on each. The DO postal liaison was responsible for the delivery and return of these forms from the post offices.

In the 24 DO's, approximately 128,000 households were re-enumerated. From these cases, over 56,000 households (44 percent) displayed response differences and over 56,000 persons (0.71 percent of the DO population) were added to census files.

**New Jersey re-enumeration**—After hearing allegations of census employees fabricating information on households without field visits, the Bureau staff reviewed the data on the ACF and the data capture file to determine if any improprieties existed. Seven DO's in northern New Jersey were identified, where the incidence was significant. The Bureau isolated the specific cases that had population counts but no information on the data capture files about characteristics from within the households. As a result of these reviews, the Bureau re-enumerated some 18,300 households.

## CLOSING THE FIELD OFFICES

### Introduction

RCC's and DO's followed similar closing procedures that were detailed in RCC memorandum series 90-D-188, including its 14 supplements. These procedures are described below.

### District Offices

The Census Bureau held two closeout conferences during the week of July 9-13, one in Charlotte, NC, and the other in Denver, CO, where RCC representatives discussed the closeout procedures in detail. The first DO's to close were the BDO's that had little or no recanvass workloads, since their postcensus local review was conducted from the MDO's. Some RCC's realigned a few of their MDO's due to shifts in postcensus workloads and other operational efficiencies. Leases for BDO's originally scheduled to close by August 15 were extended to September 15, and on a day-to-day basis after that to accommodate additional coverage improvement operations in August/September. MDO's originally scheduled to close by September 30 had leases extended to October 31, and then day-to-day for the same reasons plus expansion of the postcensus local review coverage operation.

The general plan led up to and through the "trigger" date, which alerted the BDO's, RCC's, and headquarters that the BDO was to begin closeout procedures. For BDO's with no recanvass workload, the trigger date was the date the BDO completed checkout of all questionnaires from final residual followup and re-enumeration of one-person households. For BDO's with recanvass workloads, the trigger date was the time that the BDO sent its last recanvass adds to the Baltimore PO.

When the BDO's contacted the RCC for guidance on starting the shutdown process, area managers reviewed closeout procedures with the DOM. DO's had to ensure that all late-add questionnaires from the recanvass operation were checked out, that the BDO had completed the recanvass, and that all backlogs of checkout keying batches were cleared. All ID numbers had to have been received from the Baltimore PO, and all questionnaires in the BDO shipped to the servicing PO. RCC's informed headquarters of the official trigger date that started the closeout process, so other divisions could coordinate closeout with the RCC's and DOD.

After receiving the trigger date, the BDO staff created the final CCF/ACF tape, shipped the tape to headquarters, and shut down EDP operations. RCC's notified headquarters of the final tape shipment date and monitored the EDP shutdown. During the next week, BDO's shipped expendable items such as computer and copier paper, general office supplies, etc., to the servicing MDO to supplement its stocks. A detailed list of sensitive materials (Privacy Act/Title 13 materials) was sent to each BDO together with instructions on shipping them to the RCC, or to the Data Preparation Division (DPD, Jeffersonville, IN) for

storage or final disposition. Most employment materials were sent to the RCC, which in turn sent them to the National Personnel Records Center in St. Louis, MO. Most enumeration materials were sent to the local RCC or the PO. Most blank questionnaires, old manuals, training guides, and other nonsensitive materials were disposed of on site through donation to local recycling efforts or given to nonprofit organizations collecting paper.

The methodology for disposing of furniture and equipment from DO's and RCC's was developed before acquiring any items. New equipment and furniture was purchased with the thought that the equipment would have relatively little wear by the end of the census and could be easily disposed of locally. Furniture and equipment had to be removed from all DO's prior to their closing. To accomplish this task in accordance with the Federal Property Management Regulations and the strict deadlines for terminating leases and vacating office space, the Bureau requested the General Services Administration (GSA) to assist in disposal. GSA screened Federal, State, and local agencies, and nonprofit groups to determine if there was a need for the excess equipment. GSA instructed the RCC's on how to dispose of any unclaimed items, many of which were donated to local public agencies or other tax-exempt activities. The decision to handle items locally was based on the evaluation of the enormous transportation and labor costs involved if these items had to be returned to DPD for disposition. As a last resort, any unclaimed items were shipped to the DPD. Leases for rental equipment and/or furniture were terminated and the items returned to the lessor.

The telecommunications staff decided to retain all single and two-line telephones used during the census. These were packaged and shipped to DPD.

The DO computer systems were de-installed and removed by the vendor's field engineers. The Census Bureau had purchased 110 systems and rented an additional 349. Each system consisted of one central processing unit (CPU), one disk drive, one printer, two high-speed printers, and 15 terminals with keyboards. At closing, all computer files had to be removed and sent to the responsible office: Personnel files went to the RCC and data files to headquarters. ACF/CCF files for BDO's were sent to the proper MDO for the postcensus local review operation. When the MDO's were closed, all data files were sent to the PO's. Computer equipment was removed approximately 2-3 weeks after the trigger date. The cost for each de-installation was approximately \$1,645 per DO. The Bureau-owned systems were shipped to other locations where they were needed after the DO's closed.

The final closeout was delayed due to the extended time needed to de-install the computer equipment in some DO's. As of September 14, only 82 of the BDO's (24 percent) had been closed. Delays in notifying the vendor to de-install and ship computer equipment forced the Census Bureau to extend some DO leases on a day-to-day basis. As of October 16, 328 of the BDO's had been closed (96 percent); the remaining BDO's, closed by



late October, were all in the New York region. All of the MDO's were closed by the end of November, except MDO 2403—Detroit West, which remained open until December 7, 1990, to complete a special "Were You Counted?" campaign. (See app. 6A for a list of DO opening and closing dates.)

### **Regional Census Centers**

The first RCC's to close were San Francisco on December 31, 1990, followed by New York on March 31, 1991. The Kansas City and Seattle RCC's were closed in July 1991, followed by Los Angeles (Sept. 30), Atlanta (Oct. 6), Denver (Nov. 8), and Dallas (Dec. 8). The Philadelphia RCC closed its doors in January 1992. The closings of the Boston, Charlotte, Chicago, and Detroit RCC's were delayed due to renovations of the RO's. These four offices were

closed by February 21, 1992. General instruction for closing these centers and the proper disposition of materials was provided in the Regional Administrative Manual, Form D-520.

The acquisition and disposition of furniture and equipment from the RCC's had some unique differences from the DO's. There were only 13 RCC's to contend with, so disposing of excess furniture and equipment was easier, as it could be readily transferred to the RO's to upgrade their operations when the RCC's were closed. Some of the photocopiers from the RCC's were transferred to other FLD branches or operations. Headquarters asked the GSA to allow the RCC's to deal directly with the servicing GSA regions. This request was granted and the GSA also reduced the number of days for advance notice for property disposition from 90 to 60 days. This allowed the Bureau to begin the disposal process without delay.

## APPENDIX 6A. District Offices, by Regional Office and Type

(Each RO had a matching RCC under which these DO's came. Broken lines denote MDO/BDO groups.)

| Office/State                       | Code number | Office type            | Date opened | Date closed |
|------------------------------------|-------------|------------------------|-------------|-------------|
| <b>BOSTON, MA (RO)</b> .....       | <b>2100</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| Bridgeport, CT .....               | 2101        | 1                      | 10/18/89    | 9/25/90     |
| New Haven, CT .....                | 2102        | 1                      | 9/27/89     | 9/24/90     |
| Waterbury, CT .....                | 2103        | 1                      | 10/2/89     | 9/28/90     |
| Hartford, CT .....                 | 2104        | Master 1               | 2/28/89     | 10/31/90    |
| Bristol, CT .....                  | 2105        | 1                      | 10/3/89     | 9/28/90     |
| Norwich, CT .....                  | 2121        | 2                      | 1/3/90      | 9/21/90     |
| <hr/>                              |             |                        |             |             |
| Boston (North), MA .....           | 2106        | Master 1               | 4/3/89      | 11/6/90     |
| Boston (South), MA .....           | 2107        | 1                      | 10/16/89    | 10/1/90     |
| Medford, MA .....                  | 2109        | 1                      | 10/2/89     | 9/21/90     |
| Lynn, MA .....                     | 2122        | 2                      | 10/1/89     | 10/2/90     |
| <hr/>                              |             |                        |             |             |
| Buffalo, NY .....                  | 2112        | Master 1               | 3/13/89     | 11/16/90    |
| Rochester, NY <sup>1</sup> .....   | 2133        | 2                      | 10/16/89    | 9/26/90     |
| Batavia, NY .....                  | 2134        | 2                      | 10/16/89    | 9/21/90     |
| Amherst, NY .....                  | 2135        | 2                      | 10/16/89    | 9/21/90     |
| <hr/>                              |             |                        |             |             |
| Providence, RI .....               | 2113        | <sup>2</sup> Master 1  | 10/3/89     | 10/31/90    |
| Warwick, RI .....                  | 2114        | 2                      | 9/28/89     | 9/19/90     |
| <hr/>                              |             |                        |             |             |
| Randolph, MA .....                 | 2108        | 1                      | 9/11/89     | 9/17/90     |
| W. Bridgewater, MA .....           | 2123        | 2                      | 10/10/89    | 9/18/90     |
| Fall River, MA .....               | 2124        | Master 2               | 1/23/89     | 11/2/90     |
| Hyannis, MA .....                  | 2173        | 3                      | 10/1/89     | 9/27/90     |
| <hr/>                              |             |                        |             |             |
| Waltham, MA .....                  | 2110        | 1                      | 9/1/89      | 9/19/90     |
| Lowell, MA .....                   | 2111        | 1                      | 10/1/89     | 9/18/90     |
| Worcester, MA .....                | 2125        | Master 2               | 3/1/89      | 10/29/90    |
| Springfield, MA .....              | 2126        | 2                      | 10/11/89    | 9/14/90     |
| Pittsfield, MA .....               | 2127        | 2                      | 11/1/89     | 9/14/90     |
| <hr/>                              |             |                        |             |             |
| Poughkeepsie, NY .....             | 2129        | <sup>2</sup> Master 2  | 10/1/89     | 11/2/90     |
| <hr/>                              |             |                        |             |             |
| Albany, NY .....                   | 2130        | Master 2               | 4/1/89      | 11/2/90     |
| Elmira, NY <sup>1</sup> .....      | 2131        | 2                      | 10/23/89    | 9/27/90     |
| Syracuse, NY .....                 | 2132        | 2                      | 10/23/89    | 9/25/90     |
| Plattsburgh, NY <sup>1</sup> ..... | 2176        | 3                      | 10/6/89     | 9/27/90     |
| Utica, NY .....                    | 2177        | 3                      | 9/25/89     | 9/24/90     |
| <hr/>                              |             |                        |             |             |
| S. Portland, ME .....              | 2128        | 2                      | 10/5/89     | 9/28/90     |
| Augusta, ME .....                  | 2171        | Master 3               | 2/28/89     | 10/29/90    |
| Orono, ME .....                    | 2172        | 3                      | 10/10/89    | 9/13/90     |
| <hr/>                              |             |                        |             |             |
| Portsmouth, NH .....               | 2174        | 3                      | 9/18/89     | 9/27/90     |
| Concord, NH .....                  | 2175        | Master 3               | 1/23/89     | 11/1/90     |
| S. Burlington, VT .....            | 2178        | 3                      | 10/13/89    | 9/13/90     |
| <hr/>                              |             |                        |             |             |
| <b>NEW YORK, NY (RO)</b> .....     | <b>2200</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| S. Manhattan, NY .....             | 2201        | 1                      | 12/1/89     | 10/30/90    |
| N.W. Manhattan, NY .....           | 2202        | 1                      | 11/1/89     | 10/20/90    |
| E. Manhattan, NY .....             | 2203        | 1                      | 1/3/90      | 10/25/90    |
| N.E. Manhattan, NY .....           | 2204        | 1                      | 1/3/90      | 10/25/90    |
| N. Manhattan, NY .....             | 2205        | 1                      | 12/27/89    | 10/30/90    |
| W. Manhattan, NY .....             | 2206        | Master 1               | 2/1/89      | 11/12/90    |
| <hr/>                              |             |                        |             |             |
| S.W. Brooklyn, NY .....            | 2207        | Master 1               | 1/16/89     | 11/12/90    |
| S. Brooklyn, NY .....              | 2209        | 1                      | 2/28/90     | 10/1/90     |
| Staten Island, NY .....            | 2213        | 1                      | 12/1/89     | 10/1/90     |

**District Offices, by Regional Office and Type—Continued**

| Office/State                            | Code number | Office type            | Date opened      | Date closed |
|---|-------------|------------------------|------------------|-------------|
| N. Central Brooklyn, NY                 | 2208        | 1                      | 1/29/90          | 10/30/90    |
| N. Brooklyn, NY                         | 2210        | Master 1               | 3/20/89          | 11/15/90    |
| N.E. Brooklyn, NY                       | 2211        | 1                      | 1/8/90           | 10/16/90    |
| E. Brooklyn, NY                         | 2212        | 1                      | 11/1/89          | 10/16/90    |
| N.E. Bronx, NY                          | 2214        | 1                      | 1/29/90          | 10/31/90    |
| N.W. Bronx, NY                          | 2215        | Master 1               | 3/1/89           | 11/15/90    |
| S.E. Bronx, NY                          | 2216        | 1                      | 2/28/89          | 10/24/90    |
| S.W. Bronx, NY                          | 2217        | 1                      | 12/15/89         | 10/24/90    |
| N.W. Queens, NY                         | 2218        | Master 1               | 1/16/89          | 11/15/90    |
| N.E. Queens, NY                         | 2219        | 1                      | 2/28/90          | 9/26/90     |
| S.W. Queens, NY                         | 2221        | 1                      | 2/28/90          | 9/26/90     |
| S.E. Queens, NY                         | 2220        | Master 1               | 3/20/89          | 11/15/90    |
| Ozone Park, NY                          | 2222        | 1                      | 12/1/89          | 10/1/90     |
| Middletown, NY                          | 2223        | 2                      | 9/1/89           | 10/15/90    |
| White Plains, NY                        | 2224        | Master 2               | 3/1/89           | 11/15/90    |
| Hempstead, NY                           | 2225        | Master 2               | 1/21/89          | 11/6/90     |
| Hicksville, NY                          | 2226        | 2                      | 9/1/89           | 10/6/90     |
| Ronkonkoma, NY <sup>1</sup>             | 2227        | 2                      | 9/1/89           | 10/6/90     |
| Patchogue, NY                           | 2228        | 2                      | 9/1/89           | 10/6/90     |
| Hato Rey, PR (area office) <sup>1</sup> | 2270        | 3                      | ( <sup>3</sup> ) | 9/30/90     |
| San Juan, PR                            | 2271        | 3                      | ( <sup>3</sup> ) | 9/26/90     |
| San Juan, PR                            | 2272        | 3                      | ( <sup>3</sup> ) | 9/26/90     |
| Bayamon, PR                             | 2273        | 3                      | ( <sup>3</sup> ) | 9/26/90     |
| Arecibo, PR                             | 2274        | 3                      | ( <sup>3</sup> ) | 9/26/90     |
| Aguadilla, PR                           | 2275        | 3                      | ( <sup>3</sup> ) | 9/26/90     |
| Mayaguez, PR                            | 2276        | 3                      | ( <sup>3</sup> ) | 9/26/90     |
| Ponce, PR                               | 2277        | 3                      | ( <sup>3</sup> ) | 9/26/90     |
| Caguas, PR                              | 2278        | 3                      | ( <sup>3</sup> ) | 9/26/90     |
| Carolina, PR                            | 2279        | 3                      | ( <sup>3</sup> ) | 9/26/90     |
| <b>PHILADELPHIA, PA (RO)</b>            | <b>2300</b> | <b>Regional office</b> | <b>(X)</b>       | <b>(X)</b>  |
| Jersey City, NJ                         | 2305        | Master 1               | 2/1/89           | 11/6/90     |
| Union City, NJ                          | 2306        | 1                      | 9/1/89           | 9/20/90     |
| Elizabeth, NJ                           | 2325        | 2                      | 11/20/89         | 9/19/90     |
| Hackensack, NJ                          | 2307        | 1                      | 9/1/89           | 9/21/90     |
| Bergenfield, NJ                         | 2308        | 1                      | 9/1/89           | 9/20/90     |
| Wayne, NJ                               | 2309        | 1                      | 11/1/89          | 9/18/90     |
| Orange, NJ                              | 2310        | 1                      | 11/1/89          | 9/19/90     |
| Newark, NJ                              | 2311        | Master 1               | 4/5/89           | 11/26/90    |
| Morristown, NJ                          | 2324        | 2                      | 9/1/89           | 9/19/90     |
| Trenton, NJ                             | 2312        | Master 1               | 1/23/89          | 11/5/90     |
| New Brunswick, NJ                       | 2326        | 2                      | 11/6/89          | 9/18/90     |
| Long Branch, NJ                         | 2327        | 2                      | 10/2/89          | 9/19/90     |
| Germantown, PA                          | 2314        | Master 1               | 3/27/89          | 11/15/90    |
| S. Philadelphia, PA                     | 2316        | 1                      | 10/1/89          | 9/18/90     |
| N.E. Philadelphia, PA                   | 2317        | 1                      | 10/1/89          | 9/24/90     |
| Pittsburgh, PA                          | 2318        | Master 1               | 2/20/89          | 10/26/90    |
| Green Tree, PA <sup>1</sup>             | 2340        | 2                      | 11/1/89          | 9/19/90     |
| Washington, PA                          | 2342        | 2                      | 12/11/89         | 9/7/90      |
| Annapolis, MD                           | 2321        | Master 2               | 3/20/89          | 10/26/90    |
| Landover, MD                            | 2344        | 2                      | 10/12/89         | 9/13/90     |
| Salisbury, MD                           | 2372        | 3                      | 10/1/89          | 9/13/90     |
| E. Baltimore, MD                        | 2301        | 1                      | 10/1/89          | 9/21/90     |
| W. Baltimore, MD                        | 2302        | Master 1               | 11/15/89         | 10/30/90    |
| Towson, MD                              | 2322        | Master 2               | 3/27/89          | 10/25/90    |
| Hagerstown, MD                          | 2323        | 2                      | 10/1/89          | 9/13/90     |
| Rockville, MD                           | 2345        | 2                      | 11/1/89          | 9/12/90     |

**District Offices, by Regional Office and Type—Continued**

| Office/State                     | Code number | Office type            | Date opened | Date closed |
|----------------------------------|-------------|------------------------|-------------|-------------|
| Cherry Hill, NJ                  | 2313        | 1                      | 10/4/89     | 9/21/90     |
| Lakewood, NJ                     | 2328        | 2                      | 10/2/89     | 9/19/90     |
| Woodbury, NJ                     | 2329        | Master 2               | 2/1/89      | 11/7/90     |
| Bridgetown, NJ                   | 2330        | 2                      | 10/30/89    | 9/19/90     |
| Holicong, PA                     | 2331        | 2                      | 11/1/89     | 9/20/90     |
| Norristown, PA                   | 2332        | Master 2               | 1/23/89     | 11/10/90    |
| Allentown, PA <sup>1</sup>       | 2333        | 2                      | 11/20/89    | 9/7/90      |
| W. Philadelphia, PA <sup>1</sup> | 2315        | 1                      | 10/1/89     | 10/2/90     |
| Chester, PA                      | 2334        | Master 2               | 3/27/89     | 11/16/90    |
| Lancaster, PA                    | 2335        | 2                      | 10/1/89     | 9/21/90     |
| York, PA                         | 2336        | 2                      | 11/1/89     | 9/11/90     |
| Harrisburg, PA                   | 2337        | Master 2               | 3/13/89     | 11/1/90     |
| Wilkes-Barre, PA                 | 2338        | 2                      | 11/1/89     | 9/24/90     |
| Scranton, PA                     | 2373        | 3                      | 11/1/89     | 9/19/90     |
| Altoona, Pa                      | 2339        | 2                      | 12/4/89     | 9/11/90     |
| Greensburg, PA                   | 2341        | Master 2               | 2/20/89     | 11/6/90     |
| Erie, PA                         | 2343        | 2                      | 1/22/90     | 9/19/90     |
| State College, PA                | 2374        | 3                      | 12/4/89     | 8/27/90     |
| Newark, DE                       | 2371        | Master 3               | 3/20/89     | 10/26/90    |
| <b>DETROIT, MI (RO)</b>          | <b>2400</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| E. Detroit, MI                   | 2401        | 1                      | 11/6/89     | 9/27/90     |
| N. Detroit, MI                   | 2402        | 1                      | 11/6/89     | 9/25/90     |
| W. Detroit, MI                   | 2403        | Master 1               | 1/16/89     | 12/7/90     |
| Dearborn, MI                     | 2442        | 2                      | 12/4/89     | 9/12/90     |
| Cleveland, OH                    | 2407        | Master 1               | 3/20/89     | 10/26/90    |
| S. Cleveland, OH                 | 2408        | 1                      | 12/4/89     | 9/26/90     |
| E. Cleveland, OH <sup>1</sup>    | 2409        | 1                      | 12/4/89     | 10/2/90     |
| Ann Arbor, MI                    | 2422        | 2                      | 10/23/89    | 9/28/90     |
| Lansing, MI                      | 2423        | Master 2               | 1/17/89     | 11/16/90    |
| Kalamazoo, MI <sup>1</sup>       | 2424        | 2                      | 11/20/89    | 9/28/90     |
| Grand Rapids, MI                 | 2425        | 2                      | 10/23/89    | 9/26/90     |
| Saginaw, MI                      | 2471        | 3                      | 10/23/89    | 9/21/90     |
| Mount Pleasant, MI               | 2472        | 3                      | 11/20/89    | 9/7/90      |
| Traverse City, MI                | 2473        | 3                      | 11/20/89    | 9/25/90     |
| Ishpeming, MI                    | 2474        | 3                      | 10/23/89    | 9/28/90     |
| Akron, OH                        | 2427        | Master 2               | 3/6/89      | 10/25/90    |
| Canton, OH                       | 2428        | 2                      | 11/6/89     | 10/1/90     |
| Youngstown, OH                   | 2429        | 2                      | 12/4/89     | 9/24/90     |
| Lorain, OH                       | 2431        | 2                      | 12/4/89     | 9/27/90     |
| Newark, OH <sup>1</sup>          | 2430        | 2                      | 11/6/89     | 9/25/90     |
| Worthington, OH                  | 2432        | Master 2               | 3/20/89     | 11/2/90     |
| Hilliard, OH                     | 2433        | 2                      | 11/20/89    | 9/28/90     |
| Chillicothe, OH                  | 2434        | 2                      | 12/4/89     | 9/21/90     |
| Lima, OH                         | 2439        | 2                      | 11/6/89     | 9/27/90     |
| Toledo, OH                       | 2440        | 2                      | 12/4/89     | 9/24/90     |
| Bowling Green, OH                | 2441        | 2                      | 11/6/89     | 9/26/90     |
| Springfield, OH                  | 2435        | 2                      | 12/4/89     | 10/1/90     |
| Cincinnati, OH                   | 2436        | 2                      | 12/5/89     | 10/1/90     |
| N. Cincinnati, OH <sup>1</sup>   | 2437        | Master 2               | 3/6/89      | 11/2/90     |
| Dayton, OH                       | 2438        | 2                      | 12/4/89     | 9/28/90     |
| Mount Clemens, MI <sup>1</sup>   | 2421        | 2                      | 10/23/89    | 9/14/90     |
| Davison, MI                      | 2426        | 2                      | 11/20/89    | 9/21/90     |
| Livonia, MI                      | 2443        | 2                      | 10/30/89    | 9/28/90     |
| Rochester Hills, MI              | 2444        | Master 2               | 3/16/89     | 10/25/90    |
| Morgantown, WV                   | 2451        | 2A                     | 11/27/89    | 9/25/90     |
| Beckley, WV                      | 2452        | 2A                     | 11/27/89    | 9/21/90     |
| Parkersburg, WV                  | 2453        | 2A                     | 11/27/89    | 9/26/90     |
| Charleston, WV                   | 2454        | Master 2A              | 1/16/89     | 10/26/90    |

**District Offices, by Regional Office and Type—Continued**

| Office/State                      | Code number | Office type            | Date opened | Date closed |
|-----------------------------------|-------------|------------------------|-------------|-------------|
| <b>CHICAGO, IL (RO)</b> .....     | <b>2500</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| Near S. Chicago, IL.....          | 2501        | 41                     | 3/13/89     | 9/21/90     |
| W. Chicago, IL.....               | 2502        | 1                      | 11/2/89     | 9/14/90     |
| Near N. Chicago, IL.....          | 2505        | 1                      | 10/30/89    | 9/19/90     |
| Far S. Chicago, IL.....           | 2506        | 4 Master 1             | 10/30/89    | 10/30/90    |
| Central Chicago, IL.....          | 2507        | 1                      | 10/16/89    | 9/13/90     |
| Near S.W. Chicago, IL.....        | 2508        | 1                      | 10/16/89    | 9/12/90     |
| Far S.W. Chicago, IL.....         | 2504        | Master 1               | 2/21/89     | 10/31/90    |
| Chicago, IL.....                  | 2513        | 1                      | 11/21/89    | 8/31/90     |
| Palos Hills, IL.....              | 2544        | 2                      | 11/13/89    | 9/7/90      |
| Far N. Chicago, IL.....           | 2503        | 1                      | 10/23/89    | 9/14/90     |
| N.W. Chicago, IL.....             | 2509        | Master 1               | 3/13/89     | 10/31/90    |
| Des Plaines, IL.....              | 2543        | 2                      | 10/23/89    | 8/31/90     |
| Belleville, IL.....               | 2515        | Master 1               | 1/12/89     | 10/31/90    |
| Springfield, IL.....              | 2525        | 2                      | 12/4/89     | 9/13/90     |
| Carbondale, IL.....               | 2551        | 2A                     | 12/4/89     | 9/7/90      |
| Gary, IN.....                     | 2516        | Master 1               | 3/17/89     | 10/31/90    |
| Fort Wayne, IN.....               | 2533        | 2                      | 12/4/89     | 9/7/90      |
| Lafayette, IN.....                | 2534        | 2                      | 12/17/89    | 9/20/90     |
| South Bend, IN.....               | 2535        | 2                      | 12/18/89    | 8/31/90     |
| Bloomington, IL.....              | 2523        | Master 2               | 2/21/89     | 10/31/90    |
| Champaign, IL.....                | 2524        | 2                      | 12/11/89    | 9/5/90      |
| Peoria, IL <sup>1</sup> .....     | 2526        | 2                      | 12/11/89    | 9/7/90      |
| Jeffersonville, IN.....           | 2528        | 2                      | 12/11/89    | 9/21/90     |
| Evansville, IN.....               | 2529        | 2                      | 12/18/89    | 9/13/90     |
| Central Indianapolis, IN.....     | 2530        | Master 2               | 1/11/89     | 10/31/90    |
| North Indianapolis, IN.....       | 2531        | 2                      | 12/11/89    | 9/12/90     |
| Muncie, IN <sup>1</sup> .....     | 2532        | 2                      | 12/18/89    | 8/31/90     |
| Eau Claire, WI.....               | 2536        | 2                      | 11/20/89    | 8/29/90     |
| Wausau, WI.....                   | 2537        | 2                      | 12/19/89    | 8/30/90     |
| Oshkosh, WI.....                  | 2538        | 2                      | 11/21/89    | 9/4/90      |
| Madison, WI.....                  | 2539        | Master 2               | 2/21/89     | 10/31/90    |
| Superior, WI.....                 | 2571        | 3                      | 12/4/89     | 8/29/90     |
| Green Bay, WI.....                | 2572        | 3                      | 12/18/89    | 9/20/90     |
| Aurora, IL.....                   | 2521        | 2                      | 11/6/89     | 9/19/90     |
| Waukegan, IL.....                 | 2522        | 2                      | 11/13/89    | 9/20/90     |
| Rockford, IL.....                 | 2527        | 2                      | 11/6/89     | 9/11/90     |
| Palatine, IL.....                 | 2542        | 2                      | 11/6/89     | 9/7/90      |
| Lombard, IL.....                  | 2545        | Master 2               | 1/9/89      | 10/31/90    |
| West Allis, WI <sup>1</sup> ..... | 2540        | 2                      | 11/13/89    | 8/15/90     |
| Racine, WI.....                   | 2541        | 2                      | 11/13/89    | 8/29/90     |
| Milwaukee, WI.....                | 2546        | Master 2               | 1/10/89     | 10/24/90    |
| <b>KANSAS CITY, KS (RO)</b> ..... | <b>2600</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| St. Louis, MO.....                | 2601        | Master 1               | 1/30/89     | 10/26/90    |
| S. St. Louis, MO.....             | 2602        | 1                      | 10/26/89    | 9/26/90     |
| N. St. Louis, MO.....             | 2629        | 2                      | 10/10/89    | 9/17/90     |
| Cape Girardeau, MO.....           | 2662        | 2A                     | 9/18/89     | 9/20/90     |
| Kansas City, KS.....              | 2622        | Master 2               | 1/2/89      | 10/26/90    |
| Wichita, KS.....                  | 2623        | 2                      | 10/6/89     | 9/18/90     |
| Topeka, KS <sup>1</sup> .....     | 2658        | 2A                     | 10/6/89     | 9/27/90     |
| Hays, KS.....                     | 2671        | 3                      | 10/27/89    | 9/20/90     |
| St. Paul, MN.....                 | 2624        | Master 2               | 3/6/89      | 11/2/90     |
| Coon Rapids, MN.....              | 2627        | 2                      | 12/11/89    | 9/25/90     |
| Rochester, MN.....                | 2663        | 2A                     | 12/11/89    | 9/28/90     |
| Moorhead, MN.....                 | 2672        | 3                      | 12/11/89    | 9/5/90      |
| Duluth, MN.....                   | 2673        | 3                      | 12/11/89    | 9/6/90      |
| Minneapolis, MN.....              | 2625        | Master 2               | 3/6/89      | 10/31/90    |
| Edina, MN.....                    | 2626        | 2                      | 11/20/89    | 9/21/90     |
| N. Mankato, MN.....               | 2664        | 2A                     | 10/18/89    | 9/26/90     |

**District Offices, by Regional Office and Type—Continued**

| Office/State                   | Code number | Office type            | Date opened | Date closed |
|--------------------------------|-------------|------------------------|-------------|-------------|
| Kansas City, MO                | 2628        | Master 2               | 1/30/89     | 10/31/90    |
| Springfield, MO                | 2659        | 2A                     | 10/26/89    | 9/26/90     |
| St. Joseph, MO                 | 2660        | 2A                     | 12/20/89    | 10/3/90     |
| Columbia, MO <sup>1</sup>      | 2661        | 2A                     | 10/1/89     | 9/28/90     |
| Oklahoma City, OK              | 2630        | Master 2               | 3/20/89     | 10/26/90    |
| Norman, OK                     | 2631        | 2                      | 12/15/89    | 9/14/90     |
| Tulsa, OK                      | 2632        | 2                      | 11/1/89     | 9/25/90     |
| Lawton, OK                     | 2665        | 2A                     | 10/25/89    | 9/27/90     |
| Muskogee, OK                   | 2666        | 2A                     | 11/2/89     | 9/21/90     |
| Enid, OK                       | 2674        | 3                      | 10/26/89    | 9/14/90     |
| Little Rock, AR                | 2651        | Master 2A              | 3/20/89     | 11/2/90     |
| Jonesboro, AR                  | 2652        | 2A                     | 11/20/89    | 9/22/90     |
| Pine Bluff, AR                 | 2653        | 2A                     | 11/1/89     | 9/27/90     |
| Fort Smith, AR                 | 2654        | 2A                     | 11/17/89    | 9/26/90     |
| Cedar Rapids, IA <sup>1</sup>  | 2621        | 2                      | 11/20/89    | 9/20/90     |
| Des Moines, IA                 | 2655        | Master 2A              | 3/6/89      | 11/2/90     |
| Waterloo, IA                   | 2656        | 2A                     | 12/11/89    | 9/25/90     |
| Sioux City, IA <sup>1</sup>    | 2657        | 2A                     | 11/2/89     | 9/21/90     |
| <b>SEATTLE, WA (RO)</b>        | <b>2700</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| Honolulu, HI                   | 2721        | Master 2               | 3/1/89      | 10/26/90    |
| Waipahu, HI                    | 2772        | 3                      | 9/25/89     | 9/15/90     |
| Las Vegas, NV                  | 2722        | Master 2               | 1/13/89     | 10/26/90    |
| Reno, NV                       | 2778        | 3                      | 11/3/89     | 9/15/90     |
| Salem, OR                      | 2723        | 2                      | 11/6/89     | 9/15/90     |
| Portland, OR                   | 2724        | Master 2               | 2/16/89     | 10/26/90    |
| Bend, OR                       | 2779        | 3                      | 11/20/89    | 9/15/90     |
| Eugene, OR                     | 2780        | 3                      | 11/6/89     | 9/15/90     |
| Beaverton, OR                  | 2781        | 3                      | 11/20/89    | 9/15/90     |
| Tacoma, WA                     | 2725        | Master 2               | 1/17/89     | 10/26/90    |
| Lacey, WA                      | 2782        | 3                      | 12/11/89    | 9/15/90     |
| Silverdale, WA                 | 2783        | 3                      | 10/1/89     | 9/14/90     |
| Seattle, WA                    | 2726        | Master 2               | 1/17/89     | 10/26/90    |
| Bellevue, WA                   | 2727        | 2                      | 12/4/89     | 9/15/90     |
| Everett, WA                    | 2728        | 2                      | 12/4/89     | 9/15/90     |
| Anchorage, AK                  | 2771        | Master 3               | 2/21/89     | 10/27/90    |
| Boise City, ID                 | 2773        | 3                      | 11/27/89    | 9/15/90     |
| Idaho Falls, ID                | 2774        | 3                      | 10/23/89    | 9/15/90     |
| Coeur d'Alene, ID              | 2775        | 3                      | 11/20/89    | 9/15/90     |
| Billings, MT                   | 2776        | 3                      | 11/1/89     | 9/15/90     |
| Helena, MT                     | 2777        | 3                      | 11/1/89     | 9/15/90     |
| Spokane, WA                    | 2784        | <sup>5</sup> Master 3  | 10/1/89     | 10/26/90    |
| Yakima, WA                     | 2785        | <sup>5</sup> 3         | 1/3/89      | 9/15/90     |
| <b>CHARLOTTE, NC (RO)</b>      | <b>2800</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| Louisville, KY                 | 2821        | Master 2A              | 2/21/89     | 9/14/90     |
| Ashland, KY                    | 2851        | 2A                     | 10/24/89    | 9/14/90     |
| Bowling Green, KY              | 2852        | 2A                     | 10/10/89    | 9/14/90     |
| Lexington, KY <sup>1</sup>     | 2853        | <sup>2</sup> Master 2A | 10/10/89    | 10/29/90    |
| N. Kentucky, KY                | 2854        | 2A                     | 9/18/89     | 9/14/90     |
| Hopkinsville, KY               | 2855        | 2A                     | 11/9/89     | 9/15/90     |
| W. Greenville, NC              | 2822        | 2                      | 12/15/89    | 9/28/90     |
| Raleigh, NC                    | 2823        | Master 2               | 2/21/89     | 10/26/90    |
| Fayetteville, NC               | 2824        | 2                      | 11/2/89     | 9/21/90     |
| Jacksonville, NC               | 2856        | 2A                     | 10/27/89    | 9/21/90     |
| Greenville, NC                 | 2857        | 2A                     | 11/2/89     | 9/21/90     |
| Greensboro, NC                 | 2825        | 2                      | 12/1/89     | 9/15/90     |
| Winston-Salem, NC <sup>1</sup> | 2826        | 2                      | 12/1/89     | 9/14/90     |
| Charlotte, NC                  | 2827        | Master 2               | 2/21/89     | 10/31/90    |
| Hickory, NC                    | 2858        | 2A                     | 10/2/89     | 9/17/90     |
| Asheville, NC                  | 2859        | <sup>2</sup> Master 2A | 12/29/89    | 10/25/90    |

**District Offices, by Regional Office and Type—Continued**

| Office/State                  | Code number | Office type            | Date opened | Date closed |
|-------------------------------|-------------|------------------------|-------------|-------------|
| Charleston, SC                | 2860        | <sup>2</sup> Master 2A | 1/12/90     | 10/30/90    |
| Columbia, SC                  | 2828        | Master 2               | 2/1/89      | 10/26/90    |
| Rock Hill, SC                 | 2829        | 2                      | 12/1/89     | 9/28/90     |
| Greenville, SC                | 2830        | 2                      | 12/1/89     | 9/21/90     |
| Florence, SC                  | 2861        | 2A                     | 11/13/89    | 9/21/90     |
| Memphis, TN                   | 2831        | Master 2               | 1/17/89     | 10/24/90    |
| Shelby Co., TN <sup>1</sup>   | 2867        | 2A                     | 10/24/89    | 9/28/90     |
| Alexandria, VA                | 2832        | Master 2               | 1/28/89     | 10/24/90    |
| Arlington, VA                 | 2833        | 2                      | 9/11/89     | 9/14/90     |
| N. District of Columbia, DC   | 2801        | 1                      | 11/9/89     | 9/21/90     |
| S. District of Columbia, DC   | 2802        | <sup>2</sup> Master 1  | 11/9/89     | 10/25/90    |
| Richmond, VA                  | 2834        | Master 2               | 3/20/89     | 10/31/90    |
| Charlottesville, VA           | 2870        | 2A                     | 10/10/89    | 9/28/90     |
| Roanoke, VA <sup>1</sup>      | 2872        | 2A                     | 9/15/89     | 9/28/90     |
| Christiansburg, VA            | 2873        | 2A                     | 10/2/89     | 9/28/90     |
| Kingsport, TN                 | 2862        | 2A                     | 11/30/89    | 9/14/90     |
| Chattanooga, TN               | 2863        | 2A                     | 11/9/89     | 9/28/90     |
| Knoxville, TN                 | 2864        | 2A                     | 11/16/89    | 9/21/90     |
| Nashville, TN                 | 2865        | Master 2A              | 2/21/89     | 10/25/90    |
| Murfreesboro, TN <sup>1</sup> | 2866        | 2A                     | 9/15/89     | 9/21/90     |
| Norfolk, VA <sup>1</sup>      | 2868        | Master 2A              | 1/17/89     | 10/29/90    |
| Newport News, VA              | 2869        | 2A                     | 10/25/89    | 9/14/90     |
| Portsmouth, VA                | 2871        | 2A                     | 11/16/89    | 9/14/90     |
| <b>ATLANTA, GA (RO)</b>       | <b>2900</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| N. Miami, FL                  | 2901        | Master 2               | 3/1/89      | 10/31/90    |
| N. Dade, FL                   | 2903        | 1                      | 10/23/89    | 9/25/90     |
| S. Miami, FL                  | 2902        | 1                      | 12/5/89     | 9/24/90     |
| S. Dade, FL                   | 2904        | Master 1               | 3/27/89     | 10/31/90    |
| South Fort Lauderdale, FL     | 2922        | Master 2               | 1/9/89      | 11/8/90     |
| North Fort Lauderdale, FL     | 2923        | 2                      | 11/6/89     | 9/27/90     |
| Delray Beach, FL              | 2924        | 2                      | 11/30/89    | 9/24/90     |
| N. Palm Beach, FL             | 2925        | 2                      | 10/31/89    | 9/24/90     |
| Atlanta, GA                   | 2905        | Master 1               | 1/23/89     | 11/16/90    |
| S. Atlanta, GA                | 2907        | 1                      | 10/9/89     | 9/21/90     |
| Birmingham, AL                | 2921        | Master 2               | 1/9/89      | 11/8/90     |
| Gadsden, AL <sup>1</sup>      | 2951        | 2A                     | 11/20/89    | 9/20/90     |
| Tuscaloosa, AL                | 2954        | 2A                     | 11/13/89    | 9/21/90     |
| Huntsville, AL                | 2955        | 2A                     | 11/6/89     | 8/29/90     |
| Montgomery, AL                | 2952        | 2A                     | 12/12/89    | 9/25/90     |
| Mobile, AL                    | 2953        | Master 2A              | 3/13/89     | 11/15/90    |
| Tampa, FL                     | 2931        | Master 2               | 2/27/89     | 11/7/90     |
| St. Petersburg, FL            | 2932        | 2                      | 11/6/89     | 9/18/90     |
| Clearwater, FL                | 2933        | 2                      | 10/23/89    | 9/25/90     |
| Tarpon Springs, FL            | 2934        | 2                      | 11/20/89    | 9/27/90     |
| Fort Pierce, FL               | 2926        | 2                      | 12/15/89    | 9/25/90     |
| Fort Myers, FL                | 2927        | 2                      | 11/24/89    | 9/27/90     |
| Sarasota, FL                  | 2928        | 2                      | 10/23/89    | 9/23/90     |
| Melbourne, FL                 | 2929        | 2                      | 11/13/89    | 9/18/90     |
| Lakeland, FL                  | 2930        | 2                      | 11/27/89    | 9/28/90     |
| Orlando, FL                   | 2935        | Master 2               | 3/20/89     | 11/7/90     |
| Ocala, FL                     | 2936        | 2                      | 10/16/89    | 9/26/90     |
| Daytona Beach, FL             | 2937        | 2                      | 10/30/89    | 9/20/90     |
| Jacksonville, FL              | 2938        | Master 2               | 3/6/89      | 11/15/90    |
| Gainesville, FL               | 2939        | 2                      | 11/27/89    | 9/23/90     |
| Tallahassee, FL               | 2956        | 2A                     | 10/6/89     | 9/27/90     |
| Pensacola, FL                 | 2957        | Master 2A              | 10/23/89    | 11/16/90    |



**District Offices, by Regional Office and Type—Continued**

| Office/State                    | Code number | Office type            | Date opened | Date closed |
|---------------------------------|-------------|------------------------|-------------|-------------|
| Savannah, GA                    | 2958        | 2A                     | 12/4/89     | 9/24/90     |
| Augusta, GA                     | 2960        | <sup>2</sup> Master 2A | 11/13/89    | 11/7/90     |
| Albany, GA                      | 2959        | 2A                     | 11/28/89    | 9/27/90     |
| Macon, GA <sup>1</sup>          | 2961        | Master 2A              | 2/21/89     | 11/9/90     |
| Norcross, GA                    | 2906        | 1                      | 10/9/89     | 9/20/90     |
| Athens, GA                      | 2962        | 2A                     | 10/11/89    | 9/21/90     |
| Marietta, GA <sup>1</sup>       | 2963        | Master 2A              | 1/16/89     | 11/14/90    |
| Rome, GA                        | 2964        | 2A                     | 10/18/89    | 9/26/90     |
| <b>DALLAS, TX (RO)</b>          | <b>3000</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| New Orleans, LA                 | 3001        | Master 1               | 2/1/89      | 10/26/90    |
| Metairie, LA                    | 3051        | 2A                     | 12/26/89    | 9/17/90     |
| E. Baton Rouge, LA              | 3052        | 2A                     | 10/23/89    | 9/18/90     |
| W. Baton Rouge, LA <sup>1</sup> | 3053        | 2A                     | 10/30/89    | 9/17/90     |
| Lafayette, LA                   | 3054        | 2A                     | 11/6/89     | 9/18/90     |
| Monroe, LA <sup>1</sup>         | 3055        | Master 2A              | 3/7/89      | 10/26/90    |
| Shreveport, LA                  | 3056        | 2A                     | 11/13/89    | 9/19/90     |
| Central Houston, TX             | 3002        | Master 1               | 2/27/89     | 10/26/90    |
| Pasadena, TX                    | 3006        | 1                      | 11/20/89    | 9/17/90     |
| N.E. Houston, TX                | 3023        | 2                      | 11/6/89     | 9/18/90     |
| Beaumont, TX                    | 3025        | 2                      | 11/20/89    | 9/18/90     |
| Lufkin, TX                      | 3065        | 2A                     | 12/11/89    | 9/19/90     |
| W. Houston, TX                  | 3003        | Master 1               | 2/20/89     | 10/26/90    |
| S.W. Houston, TX                | 3004        | 1                      | 12/18/89    | 9/18/90     |
| S. Houston, TX                  | 3005        | 1                      | 12/11/89    | 9/18/90     |
| N.W. Houston, TX                | 3024        | 2                      | 11/6/89     | 9/19/90     |
| Bryan, TX                       | 3066        | 2A                     | 11/1/89     | 9/19/90     |
| Central Dallas, TX              | 3007        | Master 1               | 1/17/89     | 10/26/90    |
| N.E. Dallas, TX                 | 3008        | 1                      | 10/16/89    | 9/18/90     |
| N.W. Dallas, TX                 | 3009        | 1                      | 10/16/89    | 9/19/90     |
| Mesquite, TX                    | 3010        | 1                      | 10/16/89    | 9/19/90     |
| Tyler, TX                       | 3067        | 2A                     | 11/6/89     | 9/19/90     |
| Longview, TX <sup>1</sup>       | 3069        | 2A                     | 10/16/89    | 9/20/90     |
| San Antonio, TX                 | 3021        | Master 2               | 1/30/89     | 10/26/90    |
| Austin, TX                      | 3022        | 2                      | 11/6/89     | 9/18/90     |
| Harlingen, TX <sup>1</sup>      | 3061        | 2A                     | 12/4/89     | 9/19/90     |
| Corpus Christi, TX              | 3062        | 2A                     | 10/31/89    | 9/21/90     |
| S. San Antonio, TX <sup>1</sup> | 3063        | 2A                     | 10/23/89    | 9/20/90     |
| N. San Antonio, TX              | 3064        | 2A                     | 10/10/89    | 9/19/90     |
| Arlington, TX                   | 3026        | 2                      | 10/23/89    | 9/18/90     |
| Fort Worth, TX                  | 3027        | Master 2               | 1/18/89     | 10/26/90    |
| Waco, TX                        | 3068        | 2A                     | 10/16/89    | 9/19/90     |
| Denton, TX                      | 3070        | 2A                     | 10/23/89    | 9/19/90     |
| Biloxi, MS                      | 3057        | 2A                     | 1/2/90      | 9/20/90     |
| Jackson, MS <sup>1</sup>        | 3058        | Master 2A              | 1/17/89     | 10/29/90    |
| Meridian, MS                    | 3059        | 2A                     | 12/11/89    | 9/19/90     |
| Tupelo, MS                      | 3060        | 2A                     | 12/4/89     | 9/20/90     |
| San Angelo, TX                  | 3071        | 3                      | 12/4/89     | 9/20/90     |
| El Paso, TX                     | 3072        | 3                      | 12/18/89    | 9/19/90     |
| Lubbock, TX                     | 3073        | Master 3               | 2/27/89     | 10/26/90    |
| Amarillo, TX                    | 3074        | 3                      | 12/4/89     | 9/19/90     |
| Abilene, TX                     | 3075        | 3                      | 12/4/89     | 9/21/90     |
| <b>DENVER, CO (RO)</b>          | <b>3100</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| Scottsdale, AZ                  | 3121        | 2                      | 12/11/89    | 9/28/90     |
| Phoenix, AZ                     | 3122        | Master 2               | 1/23/89     | 10/31/90    |
| Glendale, AZ                    | 3123        | 2                      | 12/11/89    | 9/28/90     |
| Tucson (urban), AZ              | 3124        | 2                      | 10/30/89    | 9/25/90     |
| Mesa, AZ                        | 3171        | 3                      | 12/11/89    | 10/2/90     |
| Tucson (rural), AZ              | 3172        | 3                      | 10/30/89    | 9/26/90     |
| Flagstaff, AZ                   | 3173        | 3                      | 11/20/89    | 9/28/90     |
| Window Rock, AZ                 | 3174        | 3                      | 1/22/90     | 10/11/90    |

**District Offices, by Regional Office and Type—Continued**

| Office/State                | Code number | Office type            | Date opened | Date closed |
|-----------------------------|-------------|------------------------|-------------|-------------|
| Denver, CO                  | 3125        | Master 2               | 3/13/89     | 10/31/90    |
| Westminster, CO             | 3126        | 2                      | 11/20/89    | 9/28/90     |
| Englewood, CO               | 3127        | 2                      | 12/11/89    | 9/28/90     |
| Evans, CO                   | 3175        | 3                      | 10/30/89    | 9/26/90     |
| Colorado Springs, CO        | 3176        | 3                      | 11/6/89     | 9/27/90     |
| Pueblo, CO                  | 3177        | 3                      | 10/10/89    | 9/27/90     |
| Grand Junction, CO          | 3178        | 3                      | 11/6/89     | 9/19/90     |
| Cheyenne, WY                | 3190        | Master 3               | 10/2/89     | 10/31/90    |
| Casper, WY                  | 3191        | 3                      | 9/15/89     | 9/26/90     |
| Omaha, NE                   | 3128        | Master 2               | 1/30/89     | 10/31/90    |
| Lincoln, NE                 | 3151        | 2A                     | 11/20/89    | 9/21/90     |
| Grand Island, NE            | 3179        | 3                      | 10/23/89    | 9/21/90     |
| North Platte, NE            | 3180        | 3                      | 1/16/90     | 9/20/90     |
| Salt Lake City, UT          | 3129        | Master 2               | 1/9/89      | 10/31/90    |
| Provo/Orem, UT              | 3188        | 3                      | 11/20/89    | 9/19/90     |
| Ogden, UT                   | 3189        | 3                      | 12/4/89     | 9/27/90     |
| Las Cruces, NM              | 3181        | 3                      | 10/16/89    | 9/25/90     |
| Albuquerque, NM             | 3182        | Master 3               | 1/17/89     | 10/31/90    |
| Santa Fe, NM                | 3183        | 3                      | 10/2/89     | 9/25/90     |
| Sioux Falls, SD             | 3186        | Master 3               | 3/13/89     | 10/31/90    |
| Rapid City, SD              | 3187        | 3                      | 10/23/89    | 9/14/90     |
| Fargo, ND                   | 3184        | 3                      | 12/18/89    | 9/27/90     |
| Bismarck, ND                | 3185        | Master 3               | 11/20/89    | 10/31/90    |
| <b>LOS ANGELES, CA (RO)</b> | <b>3200</b> | <b>Regional office</b> | <b>(X)</b>  | <b>(X)</b>  |
| S. San Diego, CA            | 3201        | Master 1               | 2/7/89      | 11/5/90     |
| Carlsbad, CA                | 3221        | 2                      | 9/18/89     | 10/5/90     |
| San Diego, CA               | 3222        | 2                      | 9/1/89      | 10/3/90     |
| Santee, CA                  | 3223        | 2                      | 9/7/89      | 10/5/90     |
| Central Los Angeles, CA     | 3202        | 1                      | 9/1/89      | 10/5/90     |
| Hollywood, CA               | 3203        | <sup>2</sup> Master 1  | 11/20/89    | 11/8/90     |
| Pasadena, CA                | 3232        | 2                      | 2/1/89      | 10/9/90     |
| E. Los Angeles, CA          | 3204        | <sup>2</sup> Master 1  | 9/7/89      | 11/6/90     |
| Whittier, CA                | 3231        | 2                      | 9/1/89      | 10/9/90     |
| La Verne, CA                | 3236        | 2                      | 12/1/89     | 10/12/90    |
| S. Central Los Angeles, CA  | 3205        | 1                      | 11/1/89     | 10/5/90     |
| Inglewood, CA               | 3206        | 1                      | 10/1/89     | 10/10/90    |
| Compton, CA                 | 3207        | Master 1               | 3/16/89     | 11/8/90     |
| Panorama City, CA           | 3208        | Master 1               | 2/17/89     | 11/7/90     |
| Glendale, CA                | 3229        | 2                      | 1/12/90     | 10/12/90    |
| Santa Monica, CA            | 3235        | 2                      | 9/1/89      | 10/10/90    |
| Riverside, CA               | 3224        | Master 2               | 2/1/89      | 11/6/90     |
| Palm Springs, CA            | 3271        | 3                      | 11/1/89     | 10/15/90    |
| Victorville, CA             | 3272        | 3                      | 11/9/89     | 10/12/90    |
| San Bernardino, CA          | 3273        | 3                      | 10/15/89    | 10/15/90    |
| Buena Park, CA              | 3225        | 2                      | 9/1/89      | 10/4/90     |
| Fullerton, CA               | 3226        | 2                      | 10/1/89     | 10/8/90     |
| Santa Ana, CA               | 3227        | <sup>6</sup> Master 2  | 11/1/89     | 11/2/90     |
| Irvine, CA                  | 3228        | 2                      | 9/1/89      | 10/4/90     |
| Long Beach, CA              | 3230        | Master 2               | 2/1/89      | 11/6/90     |
| San Pedro, CA               | 3234        | <sup>6</sup> 2         | 2/22/89     | 10/11/90    |
| Sepulveda, CA               | 3233        | 2                      | 11/30/89    | 10/5/90     |
| Ventura, CA                 | 3237        | Master 2               | 1/23/89     | 11/9/90     |
| Santa Barbara, CA           | 3238        | 2                      | 9/1/89      | 10/12/90    |
| Bakersfield, CA             | 3274        | 3                      | 10/1/89     | 10/12/90    |

**District Offices, by Regional Office and Type—Continued**

| Office/State                         | Code number | Office type                   | Date opened    | Date closed    |
|--------------------------------------|-------------|-------------------------------|----------------|----------------|
| <b>SAN FRANCISCO, CA (RCC)</b> ..... | <b>3300</b> | <b>Regional census center</b> | <b>12/1/87</b> | <b>12/1/90</b> |
| Oakland, CA .....                    | 3301        | Master 1                      | 2/21/89        | 10/29/90       |
| Hayward, CA .....                    | 3302        | 1                             | 9/29/89        | 9/25/90        |
| Berkeley, CA .....                   | 3305        | 1                             | 9/1/89         | 10/3/90        |
| S. San Francisco, CA .....           | 3303        | 1                             | 9/11/89        | 10/1/90        |
| N. San Francisco, CA .....           | 3304        | <sup>2</sup> Master 1         | 9/1/89         | 10/31/90       |
| San Mateo, CA .....                  | 3328        | 2                             | 9/7/89         | 10/3/90        |
| Visalia, CA .....                    | 3321        | 2                             | 9/5/89         | 9/21/90        |
| Fresno, CA .....                     | 3322        | Master 2                      | 4/25/89        | 10/31/90       |
| Salinas, CA .....                    | 3323        | 2                             | 9/1/89         | 10/2/90        |
| Modesto, CA .....                    | 3324        | 2                             | 11/1/89        | 9/21/90        |
| San Jose, CA .....                   | 3325        | Master 2                      | 7/17/89        | 11/7/90        |
| Sunnyvale, CA <sup>1</sup> .....     | 3326        | 2                             | 9/6/89         | 9/15/90        |
| Stockton, CA .....                   | 3373        | 3                             | 10/13/89       | 9/25/90        |
| Citrus Heights, CA .....             | 3329        | 2                             | 9/7/89         | 9/21/90        |
| Sacramento, CA .....                 | 3330        | Master 2                      | 2/9/89         | 11/8/90        |
| Chico, CA .....                      | 3333        | 2                             | 9/1/89         | 9/17/90        |
| Placerville, CA .....                | 3371        | 3                             | 9/11/89        | 8/31/90        |
| Redding, CA .....                    | 3372        | 3                             | 10/2/89        | 9/26/90        |
| Concord, CA .....                    | 3327        | 2                             | 12/4/89        | 9/15/90        |
| Santa Rosa, CA .....                 | 3331        | 2                             | 9/18/89        | 10/1/90        |
| Vallejo, CA .....                    | 3332        | Master 2                      | 4/10/89        | 11/5/90        |

<sup>1</sup>These DO's sponsored a type 4 office within their DO boundary.

<sup>2</sup>This basic district office was designated a master district office after 1988/89 prelist but before Census Day (April 1, 1990) or during the census to facilitate the handling of postcensus local review.

<sup>3</sup>Opening dates for the Puerto Rico DO's are discussed in ch. 13.

<sup>4</sup>The designation of master district office shifted from district office 2501 (Near S. Chicago, IL) to 2506 (Far S. Chicago, IL) during the census.

<sup>5</sup>The designation of master district office shifted from district office 2785 (Yakima, WA) to 2784 (Spokane, WA) during the census.

<sup>6</sup>The designation of master district office shifted from district office 3234 (San Pedro, CA) to 3227 (Santa Ana, CA) during the census.

Source: Project Management Staff MDO/DO Logistics Report, November 27, 1990, and a summary report of opening dates from the Resource Planning Branch of FLD, August 16, 1991.

## APPENDIX 6B.

### Cumulative Weekly Check-In Rates, by State: April 2-23, 1990

(A dash, "—," means no figures were reported for the weeks ending on the dates indicated below.)

| State                | Cumulative weekly check-in rate (percent) |      |      |      |
|----------------------|---|------|------|------|
|                      | 4/2                                       | 4/9  | 4/16 | 4/23 |
| Alabama              | —   | —    | 55.8 | 60.9 |
| Alaska               | 25.1                                      | 42.4 | 47.1 | 49.6 |
| Arizona              | 27.9                                      | 52.0 | 57.7 | 60.0 |
| Arkansas             | 30.7                                      | 54.8 | 61.6 | 62.9 |
| California           | 22.5                                      | 50.5 | 58.9 | 63.5 |
| Colorado             | 33.2                                      | 59.2 | 63.6 | 65.3 |
| Connecticut          | 29.3                                      | 59.5 | 62.9 | 65.1 |
| District of Columbia | 26.0                                      | 48.8 | 52.4 | 54.8 |
| Delaware             | 27.3                                      | 53.2 | 61.2 | 66.3 |
| Florida              | 21.1                                      | 51.4 | 57.2 | 59.2 |
| Georgia              | 26.0                                      | 53.4 | 59.1 | 61.1 |
| Hawaii               | 34.9                                      | 55.4 | 59.2 | 60.4 |
| Idaho                | 42.4                                      | 61.9 | 65.9 | 68.3 |
| Illinois             | 35.0                                      | 60.8 | 64.9 | 66.8 |
| Indiana              | 37.9                                      | 63.4 | 69.1 | 70.9 |
| Iowa                 | —   | 69.6 | 73.9 | 74.9 |
| Kansas               | —   | 51.6 | 66.1 | 70.1 |
| Kentucky             | 37.4                                      | 62.3 | 66.4 | 68.0 |
| Louisiana            | 24.0                                      | 50.6 | 54.8 | 56.5 |
| Maine                | 24.7                                      | 50.1 | 54.5 | 55.9 |
| Maryland             | 22.7                                      | 54.8 | 64.2 | 68.0 |
| Massachusetts        | 28.1                                      | 55.2 | 60.9 | 63.1 |
| Michigan             | 30.3                                      | 62.2 | 69.0 | 71.3 |
| Minnesota            | 30.7                                      | 64.0 | 72.9 | 74.9 |
| Mississippi          | —   | 48.2 | 58.8 | 60.3 |
| Missouri             | 36.0                                      | 57.6 | 66.3 | 67.7 |
| Montana              | 35.7                                      | 56.9 | 62.7 | 64.9 |
| Nebraska             | —   | 56.1 | 70.7 | 72.7 |
| Nevada               | 29.0                                      | 49.4 | 58.1 | 58.7 |
| New Hampshire        | —   | 52.6 | 58.1 | 61.3 |
| New Jersey           | 22.8                                      | 50.8 | 61.0 | 63.7 |
| New Mexico           | 27.4                                      | 50.1 | 57.7 | 59.9 |
| New York             | 21.3                                      | 50.2 | 57.3 | 60.2 |
| North Carolina       | 26.0                                      | 55.0 | 59.6 | 61.5 |
| North Dakota         | 40.2                                      | 64.4 | 68.5 | 71.2 |
| Ohio                 | 31.4                                      | 63.7 | 71.4 | 73.2 |
| Oklahoma             | —   | 52.0 | 59.2 | 61.0 |
| Oregon               | 33.3                                      | 57.5 | 63.1 | 65.4 |
| Pennsylvania         | 22.0                                      | 56.3 | 67.4 | 71.2 |
| Rhode Island         | 12.3                                      | 52.7 | 58.6 | 61.4 |
| South Carolina       | 19.2                                      | 46.1 | 54.7 | 55.8 |
| South Dakota         | 52.1                                      | 66.7 | 71.2 | 73.0 |
| Tennessee            | —   | 53.8 | 60.2 | 63.0 |
| Texas                | 26.8                                      | 50.2 | 57.6 | 59.6 |
| Utah                 | 29.8                                      | 53.3 | 63.2 | 65.0 |
| Vermont              | 43.6                                      | 51.7 | 58.5 | 61.8 |
| Virginia             | 29.6                                      | 59.0 | 64.4 | 68.2 |
| Washington           | 29.0                                      | 55.3 | 62.4 | 65.2 |
| West Virginia        | 39.8                                      | 57.5 | 61.3 | 63.4 |
| Wisconsin            | 40.4                                      | 70.2 | 74.5 | 76.2 |
| Wyoming              | 41.4                                      | 55.8 | 58.5 | 60.1 |

# APPENDIX 6C.

## Description of Form Numbering System and List of Public- and Field-Use Forms for the 50 States and the District of Columbia

(For Puerto Rico and outlying areas (U.S. Virgin Islands, Guam, American Samoa, Commonwealth of the Northern Mariana Islands, and the Republic of Palau), see chapter 13.)

### Description of the 1990 Census Form Numbering System

All forms designed for the 1990 census were categorized into various numbering sequences which denoted the form's general use. All forms designed by Census Bureau personnel for the 1990 census were preceded by the letter "D." The numbers in the D-series, ranging from 1 through 4199, were grouped into several categories and these categories were assigned to one or more headquarters divisions. The "D" form numbers' general use and the overall responsible divisions were as follows:

| Form numbers     | Use/specification    | Responsible division |
|------------------|----------------------|----------------------|
| D-1 thru 99      | Public use           | DPLD                 |
| D-100 thru 499   | General use          | FLD                  |
| D-500 thru 599   | Manuals              | FLD                  |
| D-600 thru 699   | Training guides/aids | FLD                  |
| D-700 thru 799   | Post office          | DPLD                 |
| D-800 thru 1499  | Evaluation           | SMD, SRD, CSMR       |
| D-1500 thru 1699 | Geography            | GEO                  |
| D-1700 thru 2799 | Procedural           | DPLD/DOD             |
| D-2800 thru 3099 | Housing              | HOUS                 |
| D-3100 thru 3199 | Population           | POP                  |
| D-3200 thru 3399 | Outreach             | User input           |
| D-3400 thru 3999 | Other/miscellaneous  | User input           |
| D-4000 thru 4199 | Leasing/buildout     | APSD                 |

The following suffixes were used to identify certain forms:

|       |  |                      |                                |
|-------|--|----------------------|--------------------------------|
| (ADP) | Computer-generated in the district offices | (S)                  | Spanish                        |
| (HSP) | High speed printer                         | (State abbreviation) | Designated form for that State |
| (L/E) | List/enumerate areas                       | (FF)                 | Field followup                 |
| (L)   | Letter                                     | (NR)                 | Nonresponse followup           |
| (OA)  | Outlying areas -- DPLD                     | (U/L)                | Update/leave                   |
| (P)   | Prelist areas                              | (T)                  | TAR areas                      |
| (LP)  | Late prelist                               | (MDO)                | Master district office         |
| (U)   | Urban                                      | (APPEND)             | Appendixes                     |
| (FC)  | First class                                |                      |                                |

There were other forms used in the 1990 census, not in the D-series, that were prefixed with letters that represented their origin: "BC"—Bureau of the Census; "CA," "HCFA," and "OWCP"—Department of Labor; "CD"—Commerce Department; "GSA"—General Services Administration; "I"—Immigration and Naturalization Service; "W"—Internal Revenue Service. Some exception to this rule were forms prefixed with the letters "OF"—optional form, and "SF"—standard form. Most of the "BC" forms were used for selection, employment, and appointment.

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-1                    | Questionnaire: 1990 Census, short-form                                     |
| D-1(S)                 | Questionnaire: 1990 Census, short-form (Spanish version)                   |
| D-1A                   | Questionnaire: 1990 Census, short-form (enumerator administered)           |
| D-1A(S)                | Questionnaire: 1990 Census, short-form (Spanish)—(enumerator administered) |
| D-2                    | Questionnaire: 1990 Census, long-form                                      |
| D-2(S)                 | Questionnaire: 1990 Census, long-form (Spanish version)                    |
| D-2A                   | Questionnaire: 1990 Census, long-form (enumerator administered)            |
| D-3                    | Instruction guide: 1990 Census short-form                                  |
| D-3(S)                 | Instruction guide: 1990 Census short-form (Spanish version)                |
| D-4                    | Instruction guide: 1990 Census long-form                                   |
| D-4(S)                 | Instruction guide: 1990 Census long-form (Spanish version)                 |
| D-5                    | Questionnaire: content reinterview   |
| D-6(FC)                | Envelope: outgoing-first class for D-1 questionnaire                       |
| D-7                    | Envelope: outgoing-first class for D-2 questionnaire                       |
| D-8A                   | Envelope: return-first class for D-1 questionnaire                         |
| D-8C                   | Envelope: return-first class for D-2 questionnaire                         |
| D-9                    | Reminder card  |
| D-10                   | Envelope: trace sample   |
| D-11                   | Questionnaire: 1990 Census, short-form (trace sample)                      |
| D-12                   | Questionnaire: 1990 Census, long-form (trace sample)                       |
| D-13                   | Questionnaire: 1990 Census, advance census report                          |
| D-14                   | Motivational insert for questionnaire D-2 packages (mailers)               |
| D-14A                  | Motivational insert for questionnaire D-1 packages (mailers)               |
| D-18(L)                | Letter: telephone assistance thank you (English and Spanish)               |
| D-20A                  | 1990 Individual Census Report, short-form                                  |
| D-20A(S)               | 1990 Individual Census Report, short-form (Spanish version)                |
| D-20B                  | 1990 Individual Census Report, long-form                                   |
| D-20B(S)               | 1990 Individual Census Report, long-form (Spanish version)                 |
| D-21                   | 1990 Military Census Report  |
| D-22                   | Poster: special place  |
| D-23                   | 1990 Shipboard Census Report   |
| D-25                   | Were You Counted? form (33 languages)                                      |
| D-26                   | Census appointment record  |
| D-27                   | Introduction for Spanish-speaking respondents                              |
| D-30(L)                | Letter: advance notification to special place                              |
| D-31                   | Privacy Act Notice (English and Spanish versions)                          |
| D-33(L)                | Letter: request for S-night locations                                      |
| D-34                   | Census information for American flag vessels                               |
| D-35(L)                | Letter: reminder 1 for American flag vessels (owners/operators)            |
| D-36(L)                | Letter: reminder 2 for American flag vessels (owners/operators)            |
| D-37                   | Label: return from American flag vessels                                   |
| D-38                   | Poster: American flag vessels  |
| D-40                   | Envelope: individual census report   |
| D-41                   | Envelope: leave-it for T-night   |
| D-43                   | Flyer: T-night special place   |
| D-44                   | Enumerator control by division of military and Coast Guard crews of ships  |
| D-45                   | Enumerator control of military and Coast Guard crews of ships              |
| D-46                   | Postcard: acknowledgment of receipts of census materials                   |
| D-47                   | Location report for American flag vessels                                  |
| D-49                   | Manual for self-enumeration: military enumeration of ships                 |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-50(L)                | Letter: congressional residence  |
| D-59B                  | Parolee/probationer information record   |
| D-60                   | Foreign language guide   |
| D-61                   | Information copy   |
| D-70                   | Informational booklet: local review program  |
| D-70(L)                | Letter: announcement for local review program to governments                               |
| D-71                   | Questionnaire: chief executive/highest elected official and program liaison identification |
| D-73                   | 1990 program review technical guide  |
| D-73(L)                | Letter: introduction for the 1990 program review technical guide                           |
| D-74(A)                | Precensus local review response form   |
| D-74(B)                | Postcensus local review response form  |
| D-76 (ADP)             | Precensus local review listing   |
| D-76(L)                | Letter: SDC/FSCPE workshop for tribal governments local review program                     |
| D-77 (ADP)             | Postcensus local review listing  |
| D-77(L)                | Letter: RO workshops for tribal governments local review program                           |
| D-90                   | Brochure: the 1990 user-defined areas program  |
| D-100(A)               | Special notice: national prelist and list/enumerate  |
| D-100(B)               | Special notice: prec canvass, nonresponse, update/leave                                    |
| D-101                  | Address register cover (prelist)   |
| D-101A                 | Address listing page (prelist)   |
| D-101B                 | Special place address listing page (prelist)   |
| D-101C                 | Callback record (prelist)  |
| D-102                  | Address register cover (precanvass)  |
| D-102A (ADP)           | Address listing page (precanvass)  |
| D-102B (ADP)           | Special place address listing page (precanvass)  |
| D-103(P)               | Address register cover (nonresponse followup—prelist areas)                                |
| D-103(T)               | Address register cover (nonresponse followup—tape address register areas)                  |
| D-103A (ADP)           | Address listing page (nonresponse followup)  |
| D-103B                 | Callback record (nonresponse followup)   |
| D-104 (1/6)            | Address register cover (list/enumerate 1/6 sample)   |
| D-104 (1/6) AK         | Address register cover (list/enumerate 1/6 sample—Alaska)                                  |
| D-104 (3/6)            | Address register cover (list/enumerate 3/6 sample)   |
| D-104 (3/6) AK         | Address register cover (list/enumerate 3/6 sample—Alaska)                                  |
| D-104A                 | Address listing page (list/enumerate 1/6 sample)   |
| D-104A (3/6)           | Address listing page (list/enumerate 3/6 sample)   |
| D-104B                 | Special place address listing page (list/enumerate)  |
| D-104C                 | List of housing units at special places (list/enumerate)                                   |
| D-104D                 | Callback record (list/enumerate)   |
| D-105                  | Address register cover (update/leave)  |
| D-105(T)               | Address register cover (urban update/leave)  |
| D-105A (ADP)           | Address listing page (update/leave)  |
| D-105B                 | Special place address listing page (update/leave)  |
| D-106                  | Address register cover (field followup)  |
| D-106A (ADP)           | Address listing page (field followup)  |
| D-106B                 | Callback record (field followup)   |
| D-107                  | Map sketch sheet   |
| D-108A (ADP)           | Address listing page (precensus local review and field coding)                             |
| D-108B (ADP)           | Address listing page (all other operations)  |
| D-109A (ADP)           | Address listing page (APOC reconciliation)   |
| D-110A (ADP)           | Address listing page (block splits)  |



## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-111A                 | Address listing page (postcensus local review)   |
| D-114 (ADP)            | Block listing  |
| D-115                  | Census map pouch   |
| D-116                  | Group quarters sampling register cover   |
| D-116A (1/6)           | Group quarters sampling page (1/6 sample)  |
| D-116B (3/6)           | Group quarters sampling register cover (3/6 sample)  |
| D-117                  | S-Night enumeration record   |
| D-118                  | S-Night flyer  |
| D-122                  | Unit report of persons enumerated  |
| D-123                  | Persons not returning MCR's  |
| D-124                  | Military installation units list   |
| D-131                  | Poster: EEO information (used in DO's)   |
| D-132                  | Poster: hotline information (used in DO's)   |
| D-132A                 | Hotline flyer  |
| D-134                  | Poster: EEO information  |
| D-135                  | Brochure: Census Awareness and Products Program  |
| D-140                  | Envelope: outgoing, white—with each RCC's return address (4-1/8 X 9-1/2)                         |
| D-141                  | Envelope: business reply, white—with each RCC's return address, RCC preaddressed (3-7/8 X 8-7/8) |
| D-142                  | Envelope: outgoing, white, right window—with each RCC's return address (4-1/8 X 9-1/2)           |
| D-143                  | Envelope: outgoing, kraft—with each RCC's return address (9-1/2 X 12-1/2)                        |
| D-144                  | Envelope: outgoing, kraft—with each RCC's return address, w/o window                             |
| D-145 (HSP)            | Label: outgoing, white—with each RCC's return address (2-15/16 X 5)                              |
| D-146                  | Label: shipping by private contractor, RCC's return address (3 X 5)                              |
| D-147 (HSP)            | Label: outgoing, blank, return address area for DO's (2-15/16 X 5)                               |
| D-148                  | Letterhead: for each regional census center  |
| D-150                  | Applicant file employee selection record/correction request                                      |
| D-150(P)               | Selection record requirements request  |
| D-151                  | Crew leader assignment list  |
| D-152                  | Crew leader record of assignments  |
| D-153                  | Crew leader record of progress and production  |
| D-154A                 | Enumerator assignment record (special place prelist and group quarters enumeration)              |
| D-154B                 | Enumerator workload record (special place prelist and group quarters enumeration)                |
| D-155                  | Checklist for identifying hard-to-enumerate areas  |
| D-156                  | Office and field coding results  |
| D-157                  | Questionnaire misdelivery record (nonresponse followup)  |
| D-160                  | Vacant/delete review   |
| D-164                  | Precanvass address register assembly (quality assurance record)                                  |
| D-165                  | Precanvass address register assembly   |
| D-169                  | Quality assurance listing and matching record  |
| D-169(LE)              | Quality assurance listing and matching record (list/enumerate)                                   |
| D-169A                 | Summary of advance listing and matching  |
| D-170                  | Record of first review (list/enumerate and field followup)                                       |
| D-171                  | Record of final review (list/enumerate and field followup)                                       |
| D-172                  | Record of first review (mailout/mailback-field followup)   |
| D-173                  | Record of final review (mailout/mailback-field followup)   |
| D-174                  | Field review checklist (APOC reconciliation)   |
| D-181                  | Field review checklist (group quarters enumeration)  |
| D-190                  | Search record  |
| D-191                  | Reinterview control record   |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-192                  | Reinterview summary record   |
| D-193                  | Quality assurance summary record (outlying areas of Alaska)                |
| D-194                  | Urban update/leave quality assurance summary record                        |
| D-200                  | Official credential card: census office employee                           |
| D-200A                 | Official credential card: census office visitor                            |
| D-201(LP)              | Master prelist ARA assignment list   |
| D-202                  | ARA shuttle report   |
| D-203(LP)              | District office authorization and manager's fiscal control                 |
| D-204                  | Cost and progress report (number 1)  |
| D-205                  | Cost and progress report (number 2)  |
| D-206                  | Operation code numbers and titles  |
| D-207                  | Cost and progress report (number 3)  |
| D-208(MDO)             | Identification information: DO management and training system              |
| D-208 (A-D)            | RCC summary: DO management and tracking system (precanvass, prelist, APOC) |
| D-209                  | Automation problem report (software/procedures)                            |
| D-210                  | Edit shift report  |
| D-212                  | Unsafe office practices and rules for evacuating building in case of fire  |
| D-214(LP)              | 1990 late prelist activities calendar                                      |
| D-214(MDO)             | Precanvass/APOC reconciliation activities calendar                         |
| D-214(P)               | 1988 prelist activities calendar   |
| D-219                  | Instructions for using management reports                                  |
| D-220                  | Collection office reports  |
| D-227                  | Stock control record   |
| D-228                  | Long-distance log  |
| D-229                  | Pre-appointment certification statement for selective service registration |
| D-230                  | Magnetic tape log  |
| D-231                  | BC-50A log   |
| D-232                  | Computer daily log   |
| D-233                  | Software change request  |
| D-234                  | Checklist: DO opening and inventory control                                |
| D-235                  | Job aid: stock and supply assistant  |
| D-239                  | Poster: questionnaire assistance   |
| D-245                  | Supply bin tags  |
| D-248                  | Poster: district office  |
| D-249                  | Poster: restricted area, confidential authorized employees only            |
| D-255                  | Flyer: It's not too late   |
| D-256                  | Bumper sticker: Count on me!   |
| D-259                  | Bumper sticker: U.S. census jobs! You can help!                            |
| D-259B                 | Flyer: Jobs  |
| D-259C                 | Flyer: Jobs! jobs! jobs!   |
| D-259D                 | Flyer: Stop!!  |
| D-259E                 | Flyer: Wait!   |
| D-262                  | Employment test: information for census job applicants                     |
| D-264                  | Postcard: reply to employment inquiry                                      |
| D-265                  | Postcard: census workers needed  |
| D-265(P)               | Postcard: census workers needed for the national prelist                   |
| D-267                  | Instruction for employee selection aid                                     |
| D-267(S)               | Instruction for employee selection aid (Spanish version)                   |
| D-267A                 | Field employee selection aid (test A)                                      |
| D-267A(S)              | Field employee selection aid (test A) (Spanish version)                    |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-267B                 | Field employee selection aid (test B)  |
| D-267B(S)              | Field employee selection aid (test B) (Spanish version)                          |
| D-268                  | Field employee selection aid answer keys and application review and rating guide |
| D-269A                 | Interview guide for enumerator   |
| D-269A1                | Interview rating for enumerator  |
| D-269A2                | Evaluating interview exercise for enumerator positions                           |
| D-269A3                | Practice interview exercise for enumerator positions                             |
| D-269A4                | Practice interview performance rating for enumerator positions                   |
| D-269B                 | Interview guide for crew leader  |
| D-269B1                | Interview rating for crew leader   |
| D-269C                 | Interview guide for clerk  |
| D-269C1                | Interview rating for office clerk  |
| D-269D                 | Interview guide for data transcriber   |
| D-269D1                | Interview rating for data transcriber  |
| D-269E                 | Interview guide for stock and supply assistant                                   |
| D-269E1                | Interview rating for stock and supply assistant                                  |
| D-269F                 | Interview guide for SOC and supervisory data transcriber                         |
| D-269F1                | Interview rating for SOC and supervisory data transcriber                        |
| D-270                  | Instructions for employee selection aid for supervisors                          |
| D-270A                 | Field employee selection aid for supervisors                                     |
| D-270B                 | Field employee selection aid for supervisors                                     |
| D-271                  | Answer keys and guidelines for evaluating supervisory candidates                 |
| D-271A                 | Interview and selection record   |
| D-273                  | Postcard: notice to report for training  |
| D-274                  | Crew leaders and training sites  |
| D-275                  | Record of training   |
| D-275(P)               | Record of training (prelist)   |
| D-276(L)               | Letter: Thank you, donor of space  |
| D-277                  | Interest and information data sheet  |
| D-280                  | Instruction for measure of adult English proficiency                             |
| D-280A                 | Measure of adult English proficiency answer sheet                                |
| D-280B                 | Measure of adult English proficiency   |
| D-280C                 | Measure of adult English proficiency (scoring key)                               |
| D-282                  | Documentation of unacceptable performance and/or conduct                         |
| D-283                  | Documentation of termination for unacceptable performance and/or conduct         |
| D-284                  | Minority employment and handicap report  |
| D-285                  | Minority group and handicap designator record                                    |
| D-286                  | Job applicant card   |
| D-288                  | Notice of suspension of work   |
| D-289                  | Notice of withheld paycheck  |
| D-292                  | Payroll/personnel batch transmittal  |
| D-293 (ADP)            | Batch validation listing   |
| D-293B (ADP)           | BC-50A transmittal control listing   |
| D-294A (ADP)           | Census payroll change listing  |
| D-294B (ADP)           | Census payroll master listing  |
| D-294C (ADP)           | Employee roster: SSN sequence  |
| D-294D (ADP)           | Employee roster: alphabetical sequence   |
| D-294E (ADP)           | DAPS to FAPS master check listing  |
| D-294F (ADP)           | Decennial census personnel transaction validation listing                        |
| D-294G (ADP)           | Decennial census personnel transaction error listing                             |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-295                  | Local review log of contacts with local officials              |
| D-296                  | Employment reference check                                     |
| D-301                  | Progress and cost report book (prelist)                        |
| D-303                  | Cost and progress report                                       |
| D-303(P)               | Using cost and progress reports                                |
| D-303B (ADP)           | Error distribution report by type of error                     |
| D-308                  | Daily pay and work record                                      |
| D-308A(P)              | Per diem expense record  |
| D-312                  | Field progress summary   |
| D-318A                 | Using crew leader reports (precanvass and APOC reconciliation) |
| D-319                  | QA weekly summary report (precanvass)                          |
| D-320                  | Error list   |
| D-323 (ADP)            | ARA directory list (name sort)                                 |
| D-324 (ADP)            | Group quarters listing   |
| D-325 (ADP)            | ARA directory listing  |
| D-326 (ADP)            | Census block numbering area counts                             |
| D-327 (ADP)            | Precensus local review listing                                 |
| D-328 (ADP)            | Precanvass suppressed units listing                            |
| D-329 (ADP)            | Special place listing  |
| D-330 (ADP)            | CCF maintenance transaction diary                              |
| D-330(LE) (ADP)        | CCF maintenance transaction diary (list/enumerate areas)       |
| D-331                  | Precanvass QA progress record                                  |
| D-332 (ADP)            | Late mail return list  |
| D-333A (ADP)           | Nonresponse ARA status, all ARA's                              |
| D-333B (ADP)           | Nonresponse ARA status   |
| D-333C (ADP)           | Nonresponse ARA status, by FOS and CLD                         |
| D-334 (ADP)            | Prelist ARA directory  |
| D-336 (ADP)            | Field followup assignment directory all ARA's                  |
| D-337 (ADP)            | Block split by tabulation boundaries                           |
| D-338 (ADP)            | Master list of block splits (cycle 1)                          |
| D-339 (ADP)            | Field followup, ARA status report                              |
| D-340 (ADP)            | Census block numbering areas mail return rates                 |
| D-341A (ADP)           | DO nonresponse followup enumerator performance report          |
| D-341B (ADP)           | RO nonresponse followup enumerator performance report          |
| D-341C (ADP)           | HQ nonresponse followup enumerator performance report          |
| D-342 (ADP)            | Nonresponse units not checked in, report                       |
| D-343A (ADP)           | DO list/enumerate ARA status report                            |
| D-343B (ADP)           | HQ list/enumerate ARA status report                            |
| D-343C (ADP)           | RO list/enumerate ARA status report                            |
| D-344                  | Prelist ARA directory  |
| D-344A (ADP)           | DO list/enumerate enumerator performance report                |
| D-344B (ADP)           | RO list/enumerate enumerator performance report                |
| D-344C (ADP)           | HQ list/enumerate enumerator performance report                |
| D-345 (ADP)            | Merge/sample tolerance check report                            |
| D-348                  | EDP batch log  |
| D-349 (ADP)            | List/enumerate merge list                                      |
| D-351                  | Special place prelist record                                   |
| D-351(GQ)              | Special place group quarters address sheet                     |
| D-351(HU)              | Special place housing unit address sheet                       |
| D-352                  | Group quarters enumeration record                              |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-353                  | Record of T-Night returns and search processing                                    |
| D-354 (ADP)            | Field followup units not checked in, report  |
| D-355                  | Batch transmittal record   |
| D-356A (ADP)           | Field followup status (all ARA's national summary by DO)                           |
| D-356B (ADP)           | Field followup status (all ARA's national summary by RCC)                          |
| D-357 (ADP)            | Final checkout transmittal   |
| D-358A (ADP)           | Field followup status (all ARA's regional summary by DO)                           |
| D-358B (ADP)           | Field followup status (all ARA's regional summary by DO by FOS)                    |
| D-359                  | DO local review response report  |
| D-361 (ADP)            | GU recanvass list (precensus local review)   |
| D-362 (ADP)            | Recanvass summary (precensus local review)   |
| D-362A (ADP)           | DO recanvass summary (precensus local review)                                      |
| D-362B (ADP)           | RCC recanvass summary (precensus local review)                                     |
| D-363 (ADP)            | GU recanvass list (postcensus local review)  |
| D-363A (ADP)           | Enumerator production report (edit followup phase 1)                               |
| D-363B (ADP)           | Enumerator production report (field followup vacant/delete)                        |
| D-364 (ADP)            | Recanvass summary (postcensus local review)  |
| D-364A (ADP)           | DO recanvass summary (postcensus local review)                                     |
| D-364B (ADP)           | RCC recanvass summary (postcensus local review)                                    |
| D-366 (ADP)            | ARA structuring assignment   |
| D-367A (ADP)           | HQ block split report  |
| D-367B (ADP)           | RCC block split report   |
| D-368A (ADP)           | HQ final checkout report   |
| D-368B (ADP)           | RCC final checkout report  |
| D-368C (ADP)           | DO final checkout report   |
| D-369 (ADP)            | Batch summary statistics for keyers  |
| D-370A (ADP)           | National prelist RCC assignment summary  |
| D-370B (ADP)           | National prelist management area assignment summary                                |
| D-370C (ADP)           | National prelist field operations supervisory assignment summary                   |
| D-370D (ADP)           | Field operations supervisory assignment summary                                    |
| D-373 (ADP)            | Control listing for yellow cards   |
| D-374                  | ARA and block coding card (yellow card)  |
| D-375                  | Work transmittal   |
| D-376                  | Refusal record   |
| D-377                  | Deletion record  |
| D-378                  | ACF maintenance record   |
| D-379                  | Merge worksheet  |
| D-380                  | Clerical edit quality assurance record   |
| D-381 (ADP)            | Error rate by work unit report   |
| D-381A (ADP)           | Trend chart, error rate by work unit   |
| D-382                  | Call record report   |
| D-383A (ADP)           | Clerical edit operations edit clerks' error distribution report                    |
| D-383B (ADP)           | Clerical edit operations edit clerks' error distribution report, by type of error  |
| D-384 (ADP)            | Record of questionnaire followup   |
| D-385 (ADP)            | Daily record counts  |
| D-386 (ADP)            | PO receipt of missing add (casing and time-of-delivery check) automated D-378 list |
| D-387 (ADP)            | DO Postmaster return report  |
| D-389 (ADP)            | List of questionnaires for resampling  |
| D-390                  | Assignment directory   |
| D-391                  | Assignment listing page  |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description  |
|------------------------|---|
| D-392                  | Quality assurance and summary record (update/leave)         |
| D-395A (ADP)           | Recruiting report (management area summary)                 |
| D-395B (ADP)           | Recruiting report (national prelist)                        |
| D-396 (ADP)            | National recruiting report                                  |
| D-396A (ADP)           | National prelist management area summary                    |
| D-396B (ADP)           | Prelist (enumeration national summary)                      |
| D-397                  | Work unit identification                                    |
| D-398                  | Edit work unit control sheet                                |
| D-398A                 | Edit summary  |
| D-398B                 | RCC edit summary  |
| D-399                  | DO/PO record of contact/referral (questionnaire assistance) |
| D-403 (ADP)            | Milestone schedule: RCC summary report                      |
| D-404A (ADP)           | Milestone schedule: HQ report                               |
| D-404B (ADP)           | Milestone schedule: RCC detailed report                     |
| D-404C (ADP)           | Milestone schedule: DO report                               |
| D-406                  | Inventory of EDP equipment                                  |
| D-407                  | Record of arrival and departure from EDP area               |
| D-410                  | Map request   |
| D-416                  | Address register control record (list/enumerate)            |
| D-417                  | Questionnaire control record (edit)                         |
| D-419                  | Telephone followup control log                              |
| D-419B                 | RCC telephone followup progress report                      |
| D-424A (ADP)           | Recruiting sources report by race and sex                   |
| D-424B (ADP)           | County/BNA applicant report                                 |
| D-424C (ADP)           | Applicant background profile report by county               |
| D-424D (ADP)           | Applicant background profile report                         |
| D-425 (ADP)            | Employee selection record                                   |
| D-426                  | Administrative record of returned documents                 |
| D-426(P)               | Administrative record of returned documents (prelist)       |
| D-430A (ADP)           | DO daily pay vouchers                                       |
| D-430B (ADP)           | DO weekly pay vouchers                                      |
| D-430C (ADP)           | Hours listing   |
| D-430D (ADP)           | Per diem claims report                                      |
| D-430F (ADP)           | Employees exceeding \$10 for other expenses                 |
| D-430G (ADP)           | Employees exceeding \$20 for communication expenses         |
| D-430H (ADP)           | Overtime claims report                                      |
| D-430I (ADP)           | Employees with new addresses                                |
| D-430J (ADP)           | Employees who have worked their last day                    |
| D-430K (ADP)           | Employees claiming more than 8 hours of training            |
| D-430L (ADP)           | Cumulative pieces completed (report)                        |
| D-430M (ADP)           | NTE [not to exceed] report                                  |
| D-431A (ADP)           | Hours edit, rejected D-308 records report                   |
| D-431B (ADP)           | Pay computed, rejected records report                       |
| D-431C (ADP)           | Manually computed payroll data report                       |
| D-431D (ADP)           | Comprehensive payroll report                                |
| D-431E (ADP)           | Payroll control register (summary data report)              |
| D-431F (ADP)           | Overtime claims (report)                                    |
| D-431G (ADP)           | Reclaims submitted (report)                                 |
| D-431H (ADP)           | Treasury check tape listing                                 |
| D-431I (ADP)           | Payroll cumulative earnings (report)                        |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-431J (ADP)           | Fund report  |
| D-431K (ADP)           | Per diem claims (report)   |
| D-431L (ADP)           | Employees exceeding 500 miles per week (report)                        |
| D-431M (ADP)           | Employees exceeding \$50 for other expenses (report)                   |
| D-431N (ADP)           | Employees exceeding \$50 for communications (report)                   |
| D-431O (ADP)           | Employees with supplemental payments (report)                          |
| D-431P (ADP)           | Quarterly FICA report  |
| D-431Q (ADP)           | FLSA recalculations for late payrolls                                  |
| D-432                  | Manually computed payment  |
| D-444 (HSP)            | Earnings statement   |
| D-450(P)               | Regional technician's action plan (prelist)                            |
| D-462                  | Inner city enumeration selected area report                            |
| D-475                  | Supply requirements for the census                                     |
| D-476                  | Forms, supplies, equipment, and materials required for the census      |
| D-501                  | DO administrative manual   |
| D-501(P)               | Prelist office administrative manual                                   |
| D-504                  | Office operations manual   |
| D-506                  | Office manager's manual  |
| D-506-1                | Manager's handbook (type 1 office)                                     |
| D-506-2                | Manager's handbook (type 2 office)                                     |
| D-506-2A               | Manager's handbook (type 2A office)                                    |
| D-506-3                | Manager's handbook (type 3 office)                                     |
| D-509                  | Storefront office manual   |
| D-510                  | Census community awareness specialist manual                           |
| D-511                  | Reinterview crew leader manual   |
| D-512                  | Tribal liaison program resource manual                                 |
| D-512A                 | Alaska Native village liaison program resource manual                  |
| D-513                  | Crew leader's manual (APOC reconciliation)                             |
| D-513.1                | APOC reconciliation job aid for on-the-job training and review         |
| D-513.2                | APOC reconciliation job aid for repairing add listings pages           |
| D-514                  | Enumerator instructions (APOC reconciliation)                          |
| D-514.1                | Interview for APOC reconciliation enumerators                          |
| D-515                  | Manager's problem solver   |
| D-516                  | RCC manager's handbook (prelist)                                       |
| D-517                  | Job instructions for testing and selecting                             |
| D-517(P)               | Job instructions for testing and selecting (prelist)                   |
| D-518                  | 1990 Alaska native village liaison program training guide              |
| D-518A                 | 1990 Alaska native village liaison program training guide (attachment) |
| D-519                  | Geographic handbook  |
| D-520                  | Regional administrative manual   |
| D-520(P)               | Regional administrative handbook (prelist)                             |
| D-521                  | RCC control clerk's manual   |
| D-522                  | Regional data processing manual  |
| D-523                  | Regional technician's checklist  |
| D-524                  | Job aid: orientation training  |
| D-527(L)               | Block split manual (list/enumerate)                                    |
| D-527(P)               | Block split manual   |
| D-529                  | Glossary of census operations  |
| D-530                  | Field operations manual  |
| D-530 (APPEND)         | Field operations manual (appendixes A thru F)                          |



## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-530(P)               | Field operations manual (prelist)                                  |
| D-530.1                | Job aid: assembling prec canvass address registers                 |
| D-532(E)               | Job aid: office clerks (vacant/delete check)                       |
| D-532A                 | Edit manual  |
| D-532A.1               | Job aid: general problems and short-form questionnaires            |
| D-532A.2               | Job aid: long-form questionnaires                                  |
| D-532B                 | Telephone followup manual  |
| D-532C                 | Questionnaire control manual (type 3)                              |
| D-532D                 | Edit quality assurance manual                                      |
| D-532E                 | Vacant/delete check manual   |
| D-532F                 | Office control manual (type 2)                                     |
| D-532G                 | Merge manual   |
| D-532I                 | Job aid: resampling  |
| D-533                  | Office coding manual   |
| D-534                  | Prelist manager's handbook   |
| D-534.1                | Prelist office clerk's manual                                      |
| D-535                  | Prelist enumeration instructions                                   |
| D-535.1                | Prelist enumerator instructions                                    |
| D-536                  | Advance lister's manual  |
| D-536.1                | Job aid: prelist induction/first review (prelist)                  |
| D-537                  | Prelist crew leader's manual                                       |
| D-537.1                | Job aid: enumerator on-the-job training (prelist)                  |
| D-537.2                | Job aid: matching and reconciliation                               |
| D-538                  | Prelist repair instructions  |
| D-539                  | Precanvass enumerator instructions                                 |
| D-540                  | Precanvass quality control enumerator's manual                     |
| D-541                  | Precanvass crew leaders' manual                                    |
| D-541.1                | Job aid: induction/first review (precanvass)                       |
| D-541.2                | Job aid: progress and cost reporting                               |
| D-542                  | Precanvass repair instructions                                     |
| D-543(P)               | Field coder's manual (prelist)                                     |
| D-543(T)               | Field coder's manual (TAR)   |
| D-544A                 | Using crew leader reports  |
| D-545                  | Questionnaire assistance manual                                    |
| D-547(P)               | Nonresponse followup enumerator job instructions (prelist areas)   |
| D-547(T)               | Nonresponse followup enumerator job instructions (TAR areas)       |
| D-548                  | Enumerator instructions update/leave                               |
| D-548(T)               | Enumerator instructions (urban update/leave)                       |
| D-549                  | Enumerator instructions (list/enumerate)                           |
| D-550A                 | Nonresponse followup closeout procedures                           |
| D-550B                 | Nonresponse followup closeout procedures for crew leaders          |
| D-550C                 | Nonresponse followup closeout procedures for enumerators           |
| D-550P                 | Census closeout address check                                      |
| D-551                  | Field followup enumerator's manual (list/enumerate areas)          |
| D-552                  | Field followup crew leaders' manual (list/enumerate areas)         |
| D-553P                 | Nonresponse followup crew leaders' manual (prelist areas)          |
| D-553T                 | Nonresponse followup crew leaders' manual (TAR areas)              |
| D-553.1(P)             | Job aid: NRFU on-the-job training and first review (prelist areas) |
| D-553.1(T)             | Job aid: NRFU on-the-job training and first review (TAR areas)     |
| D-554                  | Crew leaders' manual (update/leave)                                |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-554.1                | Job aid: quality control and on-the-job training (update/leave areas)  |
| D-554.2                | Job aid: repairing address registers (update/leave areas)              |
| D-555                  | Crew leaders' manual (list/enumerate)                                  |
| D-555.1                | Job aid: enumerator on-the-job training and first review               |
| D-555.2                | Job aid: matching and reconciliation                                   |
| D-555.3                | Job aid: recanvass   |
| D-556                  | Reinterviewer's manual   |
| D-557(P)               | Field followup enumerator job instructions (prelist areas)             |
| D-557(T)               | Field followup enumerator job instructions (TAR areas)                 |
| D-559(P)               | Field followup crew leaders' manual (prelist areas)                    |
| D-559.1(P)             | Job aid: field followup enumerator on-the-job training and review      |
| D-559(T)               | Field followup crew leaders' manual (TAR areas)                        |
| D-559.1(T)             | Job aid: field followup enumerator on-the-job training and review      |
| D-560                  | Advance lister's manual  |
| D-561                  | Questionnaire reference book   |
| D-562                  | Dictionary of census terms   |
| D-563(P)               | Precensus local review enumerator instructions (prelist areas)         |
| D-563(T)               | Precensus local review enumerator instructions (TAR areas)             |
| D-564(L)               | Postcensus local review enumerator instructions (list/enumerate areas) |
| D-564(P)               | Postcensus local review enumerator instructions (prelist areas)        |
| D-564(T)               | Postcensus local review enumerator instructions (TAR areas)            |
| D-565 (A)              | Special place operations manual (early operations)                     |
| D-565 (B)              | Special place operations manual (late operations)                      |
| D-566                  | Office operations manual (outlying areas of Alaska)                    |
| D-567                  | Urban update/enumerate manual  |
| D-569                  | Group quarters enumerator manual                                       |
| D-570                  | Special place prelist crew leaders' manual                             |
| D-571 (phase 1)        | Job aid: S-Night enumerator (shelters and subsidized units)            |
| D-571 (phase 2)        | Job aid: S-Night enumerator (street and commerce places)               |
| D-572                  | Group quarters crew leaders' manual                                    |
| D-573                  | Team leaders' manual (outlying areas of Alaska)                        |
| D-575                  | Census representatives' manual   |
| D-576                  | Self-enumeration manual (military installations)                       |
| D-577                  | Crew leaders' manual (self-enumerating places)                         |
| D-578                  | Manual for self enumerating places (group quarters)                    |
| D-579                  | Enumerator instructions (outlying areas of Alaska)                     |
| D-581                  | District office personnel and payroll manual (type 1 office)           |
| D-581.1                | Job aid: personnel and payroll clerk                                   |
| D-582                  | District office personnel and payroll manual (type 2 office)           |
| D-582.1                | Job aid: personnel and payroll clerk                                   |
| D-583                  | District office personnel and payroll manual (type 3 office)           |
| D-583.1                | Job aid: personnel and payroll clerk                                   |
| D-584                  | Stock and supply assistant's manual                                    |
| D-585                  | EDP security manual  |
| D-586                  | EDP operations manager's manual  |
| D-587                  | Keying instructions  |
| D-588                  | Batch control manual   |
| D-588A                 | Batch control manual (precensus operations)                            |
| D-590                  | Enumerator administrative and payroll manual                           |
| D-592                  | Field operations supervisor payroll and administrative manual          |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description  |
|------------------------|---|
| D-593                  | Office clerk payroll and administrative manual                            |
| D-594                  | Systems manager's handbook  |
| D-595                  | Automation technician's handbook  |
| D-596                  | Computer operator's handbook  |
| D-601                  | Guide for training assistant managers for administration                  |
| D-601.1                | Workbook for training assistant managers for administration               |
| D-606                  | Guide for training office managers  |
| D-606(LP)              | Guide for training office managers (late prelist areas)                   |
| D-606(MDO)             | Guide for training office managers (master district offices)              |
| D-606.1                | Workbook for training office managers                                     |
| D-606.1(LP)            | Workbook for training office managers (late prelist)                      |
| D-606.1(MDO)           | Workbook for training office managers (master district offices)           |
| D-611                  | Crew leader on-the-job training (reinterview)                             |
| D-612                  | Guide for training, 1990 tribal liaison program                           |
| D-612.1                | Guide for training, 1990 tribal liaison program (attachments)             |
| D-613                  | Guide for training crew leaders (APOC reconciliation)                     |
| D-613.1                | Workbook for APOC reconciliation training (crew leaders)                  |
| D-614                  | Guide for training enumerators, APOC reconciliation (1988 prelist)        |
| D-614.1                | Self-study for enumerators, APOC reconciliation (1988 prelist)            |
| D-614.2                | Workbook for APOC reconciliation training (enumerators)                   |
| D-614.3A               | APOC reconciliation training map # 1                                      |
| D-614.3B               | APOC reconciliation training map # 2                                      |
| D-617                  | Guide for training the testing and selecting clerks                       |
| D-617.1                | Workbook for training the testing and selecting clerks                    |
| D-617(P)               | Guide for training the testing and selecting clerks (prelist)             |
| D-617.1(P)             | Workbook for training the testing and selecting clerks (prelist)          |
| D-618                  | Guide for training (Alaska Native village liaison program)                |
| D-618.1                | Guide for training (Alaska Native village liaison program) (attachments)  |
| D-627(L)               | Guide for training block split enumerators (list/enumerate areas)         |
| D-627.1(L)             | Workbook for training block split enumerators (list/enumerate areas)      |
| D-627(P)               | Guide for training block split enumerators (prelist areas)                |
| D-627.1(P)             | Workbook for training block split enumerators (prelist areas)             |
| D-627(T)               | Guide for training block split enumerators (TAR areas)                    |
| D-627.1(T)             | Workbook for training block split enumerators (TAR areas)                 |
| D-628                  | On-the-job training guide for assignment control                          |
| D-630                  | Guide for training prec canvass field operations supervisors              |
| D-630.1                | Workbook for training field operations supervisors (pre canvass)          |
| D-630(LP)              | Guide for training 1989 prelist field operations supervisors              |
| D-630.1(LP)            | Workbook for training field operations supervisors (1989 prelist)         |
| D-630(L/E)             | Guide for training field operations supervisors (list/enumerate)          |
| D-630.1(L/E)           | Workbook for training field operations supervisors (list/enumerate)       |
| D-630(MO/MB)           | Guide for training nonresponse followup field operations supervisors      |
| D-630.1(MO/MB)         | Workbook for training field operations supervisors (nonresponse followup) |
| D-630(P)               | Guide for training prelist field operations supervisors                   |
| D-630.1(P)             | Workbook for training field operations supervisors (1988 prelist)         |
| D-630(U/L)             | Guide for training update/leave field operations supervisors              |
| D-630.1(U/L)           | Workbook for training field operations supervisors (update/leave)         |
| D-631                  | Guide for training APOC reconciliation field operations supervisors       |
| D-631.1                | Workbook for training APOC reconciliation field operations supervisors    |
| D-632A                 | Guide for training edit clerks  |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description  |
|------------------------|---|
| D-632B                 | Guide for training telephone followup clerks                              |
| D-632C                 | Guide for training office control clerks                                  |
| D-632D                 | Guide for training quality-control clerks                                 |
| D-632E                 | Outline for vacant/delete check clerks' on-the-job training               |
| D-632F                 | Outline for office control clerks' on-the-job training (type 2 offices)   |
| D-632G                 | Outline for merge clerks' on-the-job training                             |
| D-632I                 | Resampling on-the-job training  |
| D-633                  | Office coding on-the-job training   |
| D-634                  | Guide for training prelist managers                                       |
| D-634.1                | Workbook for training prelist managers                                    |
| D-634.2                | Outline for prelist office clerks' on-the-job training                    |
| D-635                  | Guide for training prelist enumerators                                    |
| D-635.1                | Enumerator self-study for prelist   |
| D-635.2                | Workbook for training prelist enumerators                                 |
| D-635.3                | Abbotsville rural map training package                                    |
| D-635.4                | Abbotsville urban map training package                                    |
| D-635.5                | Address register for training prelist enumerators                         |
| D-635.6 - .9           | Various training aids used to train prelist enumerators                   |
| D-636                  | Guide for training advance listers  |
| D-636.1                | Workbook for training advance listers                                     |
| D-637                  | Guide for training prelist crew leaders                                   |
| D-637.1                | Workbook for training prelist crew leaders                                |
| D-637.2                | Advance listing and matching record for training                          |
| D-638                  | Workbook for training EEO for field operation supervisors                 |
| D-639                  | Guide for training prec canvass enumerators                               |
| D-639.1                | Self-study for prec canvass enumerators                                   |
| D-639.2                | Workbook for training prec canvass enumerators                            |
| D-640                  | Guide for training prec canvass quality-control enumerators               |
| D-640.1                | Workbook for training prec canvass quality-control enumerators            |
| D-640.2                | Prec canvass address register pages for training                          |
| D-640.3                | Suppressed unit listings for training                                     |
| D-641                  | Guide for training prec canvass crew leaders                              |
| D-641.1                | Workbook for training prec canvass crew leaders                           |
| D-642                  | Trainer's aid for EEO   |
| D-643(P)               | Guide for training field coders (prelist areas)                           |
| D-643.1(P)             | Workbook for training field coders  |
| D-643(T)               | Guide for training field coders (TAR areas)                               |
| D-643.1(T)             | Workbook for training field coders (TAR areas)                            |
| D-645                  | Guide for training questionnaire assistance clerks for walk-in centers    |
| D-645.1                | Workbook for training questionnaire assistance clerks for walk-in centers |
| D-645.2                | Training aid for short-form questionnaire assistance clerks               |
| D-647(P)               | Guide for training nonresponse followup enumerators (prelist areas)       |
| D-647.1(P)             | Self-study for nonresponse followup enumerators (prelist areas)           |
| D-647.2(P)             | Workbook for training nonresponse followup enumerators (prelist areas)    |
| D-647.3 - .9(P)        | Training aid for nonresponse followup enumerators (prelist areas)         |
| D-647(T)               | Guide for training nonresponse followup enumerators (TAR areas)           |
| D-647.1(T)             | Self-study for nonresponse followup enumerators (TAR areas)               |
| D-647.2(T)             | Workbook for training nonresponse followup enumerators (TAR areas)        |
| D-647.3 - .9(T)        | Training aid for nonresponse followup enumerators (TAR areas)             |
| D-648                  | Guide for training update/leave enumerators                               |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-648.1                | Self-study for update/leave enumerators  |
| D-648.2                | Workbook for training update/leave enumerators                                   |
| D-648.3A - .7          | Training aids for update/leave and urban update/leave enumerators                |
| D-649                  | Guide for training list/enumerate enumerators                                    |
| D-649.1                | Self-study for list/enumerate enumerators  |
| D-649.2                | Self-study ARA map   |
| D-649.3                | Self-study address listing page  |
| D-649.4                | Workbook for training list/enumerate enumerators                                 |
| D-649.3B - .8          | Training aids for training list/enumerate enumerators                            |
| D-651                  | Guide for training field followup enumerators (list/enumerate areas)             |
| D-651.1                | Workbook for training field followup enumerators (list/enumerate areas)          |
| D-652                  | Guide for training field followup crew leaders (list/enumerate areas)            |
| D-652.1                | Workbook for training field followup crew leaders (list/enumerate areas)         |
| D-653(P)               | Guide for training nonresponse crew leaders (prelist areas)                      |
| D-653.1(P)             | Workbook for training nonresponse followup crew leaders (prelist areas)          |
| D-653(T)               | Guide for training nonresponse crew leaders (TAR areas)                          |
| D-653.1(T)             | Workbook for training nonresponse followup crew leaders (TAR areas)              |
| D-654                  | Guide for training update/leave crew leaders                                     |
| D-654.1                | Workbook for training update/leave crew leaders                                  |
| D-655                  | Guide for training list/enumerate crew leaders                                   |
| D-655.1                | Workbook for training list/enumerate crew leaders                                |
| D-656                  | Guide for training reinterviewers  |
| D-656.1                | Workbook for training reinterviewers   |
| D-657(P)               | Guide for training field followup enumerators (prelist areas)                    |
| D-657.1(P)             | Workbook for training field followup enumerators (prelist areas)                 |
| D-657(T)               | Guide for training field followup enumerators (TAR areas)                        |
| D-657.1(T)             | Workbook for training field followup enumerators (TAR areas)                     |
| D-659(P)               | Guide for training field followup crew leaders (prelist areas)                   |
| D-659.1(P)             | Workbook for training field followup crew leaders (prelist areas)                |
| D-659(T)               | Guide for training field followup crew leaders (TAR areas)                       |
| D-659.1(T)             | Workbook for training field followup crew leaders (TAR areas)                    |
| D-660                  | Guide for training list/enumerate advance listers                                |
| D-660.1                | Workbook for training list/enumerate advance listers                             |
| D-660.2                | Training map for advance listers   |
| D-663(P)               | Guide for training precensus local review enumerators (prelist areas)            |
| D-663.1(P)             | Workbook for training precensus local review enumerators (prelist areas)         |
| D-663(T)               | Guide for training precensus local review enumerators (TAR areas)                |
| D-663.1(T)             | Workbook for training precensus local review enumerators (TAR areas)             |
| D-664(L)               | Guide for training postcensus local review enumerators (list/enumerate areas)    |
| D-664.1(L)             | Workbook for training postcensus local review enumerators (list/enumerate areas) |
| D-664(P)               | Guide for training postcensus local review enumerators (prelist areas)           |
| D-664.1(P)             | Workbook for training postcensus local review enumerators (prelist areas)        |
| D-664(T)               | Guide for training postcensus local review enumerators (TAR areas)               |
| D-664.1(T)             | Workbook for training postcensus local review enumerators (TAR areas)            |
| D-665 (part 1)         | Guide for training special place operations supervisor (part 1)                  |
| D-665 (part 2)         | Guide for training special place operations supervisor (part 2)                  |
| D-665.1                | Workbook for training special place operations supervisors                       |
| D-666                  | Guide for training for the 1990 local review program                             |
| D-666.1                | Workbook for training for the 1990 local review program                          |
| D-668                  | Guide for training special place prelist enumerators                             |

## List of Public- and Field-Use Forms for the 50 States and the District of Columbia—Continued

(For Puerto Rico and outlying areas, see chapter 13.) Spanish versions of these forms were identified by a "S" following the form number.

| Series and form number | Title or description   |
|------------------------|--|
| D-668.1                | Workbook for training special place prelist enumerators                        |
| D-669                  | Guide for training group quarters enumeration enumerators                      |
| D-669.1                | Group quarters sampling register for training                                  |
| D-669.2                | Workbook for training group quarters enumeration enumerators                   |
| D-669.3                | Self-study for T-night enumerators   |
| D-669.4                | Self-study answer key for T-night enumerators                                  |
| D-670                  | Guide for training special place prelist crew leaders                          |
| D-670.1                | Workbook for training special place prelist crew leaders                       |
| D-671 (phase 1)        | Guide for training phase 1 S-night enumerators (shelters/subsidized units)     |
| D-671.1 (phase 1)      | Workbook for training phase 1 S-night enumerators                              |
| D-671 (phase 2)        | Guide for training phase 2 S-night enumerators (street and commerce places)    |
| D-671.1 (phase 2)      | Workbook for training phase 2 S-night enumerators (street and commerce places) |
| D-672                  | Guide for training group quarters enumeration crew leaders                     |
| D-672.1                | Workbook for training group quarters enumeration crew leaders                  |
| D-673                  | Guide for training team leaders (outlying areas of Alaska)                     |
| D-673.1                | Self-study for team leaders (outlying areas of Alaska)                         |
| D-673.2                | Workbook for training team leaders (outlying areas of Alaska)                  |
| D-673.3 - .11          | Training aids for training team leaders (outlying areas of Alaska)             |
| D-674                  | Guide for training special place team leaders (outlying areas of Alaska)       |
| D-674.1                | Workbook for training special place operations team leaders                    |
| D-677                  | Self-study for crew leaders for self-enumerating group quarters                |
| D-679                  | Outline for enumerator training (outlying areas of Alaska)                     |
| D-699                  | Self-study for the Census Awareness and Products Program handbook              |
| D-699.2                | Guide for the Census Awareness and Products Program handbook                   |
| D-700A (W 1 - 3)       | Advance post office check address card (wave 1 thru 3)                         |
| D-700C                 | Vendor address card  |
| D-701                  | Casing address card  |
| D-702                  | Post office report of missing addresses  |
| D-713 (W 1 - 3)        | Duplicate header card  |
| D-714 (W 1 - 3)        | Undeliverable header card  |
| D-716(L)               | Letter: request for location information                                       |
| D-717                  | Quality assurance summary record (APOC)  |
| D-722                  | Post office report of missing addresses casing check (blue card)               |
| D-740                  | USPS carrier instructions for 1990 mailing packages                            |
| D-741                  | Label: shipping of 1990 mailing packages                                       |
| D-741A                 | Label: shipping of 1990 update/leave mailing packages                          |
| D-744                  | Missing header card (casing check)   |
| D-746                  | USPS instructions for APOC   |
| D-747                  | Label: outgoing shipping of 1990 APOC cards and materials                      |
| D-749                  | Label: return shipping of 1990 APOC cards and materials                        |
| D-750                  | USPS instructions for casing   |
| D-754                  | Address list correction request  |
| D-755                  | USPS instruction for mail reminder cards                                       |
| D-757                  | DO daily mail count  |
| D-759                  | RCC mailing record   |
| D-806                  | Reinterview and reconciliation questionnaire                                   |
| D-1014                 | S-Night enumerator debriefing questionnaire                                    |

## APPENDIX 6D.

### Facsimiles of Selected Field-Use Forms

| Series and form number | Title or description   | Page |
|------------------------|--|------|
| BC-50A (AAD)           | Notice of Short-Term Employment (excepted appointment overprint) | 2    |
| BC-110                 | Census Enumerator Official Credential                            | 3    |
| BC-112                 | Notice, Restrictions on the Political Activity of Employees      | 4    |
| D-31                   | Privacy Act Notice   | 5    |
| D-103A (ADP)           | Address Listing Page--Nonresponse Followup                       | 6    |
| D-104A                 | Address Listing Page--List/Enumerate                             | 7    |
| D-116A (1/6)           | Group Quarters Sampling Page (1/6 Sample)                        | 8    |
| D-160                  | Vacant/Delete Review   | 9    |
| D-204                  | Cost and Progress Report (Number 1)                              | 10   |
| D-308                  | Daily Pay and Work Record  | 11   |
| D-351                  | Special Place Prelist Record                                     | 12   |
| D-351(GQ)              | Special Place Group Quarters Address Sheet                       | 13   |
| D-351(HU)              | Special Place Housing Units Address Sheet                        | 14   |
| D-376                  | Refusal Record   | 15   |
| D-377                  | Deletion Record  | 16   |
| SF-181                 | Race and National Origin Identification                          | 17   |
| SF-256                 | Self-Identification of Handicap                                  | 18   |



BC-50A (AAD). Notice of Short-Term Employment (excepted appointment overprint)

USE FOR NEW HIRES

|  |  |   |
|--|--|---|
| FORM <b>BC-50A</b><br>(2-5-85)<br>EXCEPTION TO SF-50A<br>APPROVED BY OIRM (2-85) | <b>NOTICE OF SHORT-TERM EMPLOYMENT</b><br><b>APPOINTMENTS MAY NOT EXCEED 180 DAYS.</b><br><b>THIS FORM WILL BE USED ONLY FOR EMPLOYEES FOR MAJOR AND SPECIAL CENSUSES.</b> | U.S. DEPARTMENT OF COMMERCE<br>BUREAU OF THE CENSUS<br><br><b>AAD</b> |
|--|--|---|

| TO BE COMPLETED BY APPLICANT<br><b>PART A — QUALIFICATIONS STATEMENT</b>  | FOR AGENCY USE<br><b>PART B — NOTICE OF PERSONNEL ACTION</b>  |
|---|---|
| Please read instructions on the back of the last copy of this form before completing items 1-17.<br>WARNING: Making false statements on this form is punishable by law.   |   |
| <b>1. Name (Last, First, M.I.) (Please print)</b> _____ Sex <input type="checkbox"/> Male <input type="checkbox"/> Female   | <b>18. Veteran Preference</b><br>1—None      4—10 Pt. Comp.<br>2—5 Pt.      5—10 Pt. Other<br>3—10 Pt. Disab.      6—10 Pt./30% Comp.   |
| <b>2. Birth Date (Month, Day, Year)</b> _____   | <b>19. Citizenship</b><br>1—U.S.<br>8—Other   |
| <b>3. Social Security Number</b> _____  | <b>20. Position Occupied</b><br>1—Competitive<br>2—Excepted   |
| <b>4. Home Address (No., Street, City, State, ZIP Code)</b> _____ Telephone Number (Include Area Code) _____  | <b>21. Serv. Comp. Date (Leave)</b> _____   |
| <b>5. In Emergency Notify (Name, No., Street, City, State and ZIP Code)</b> _____ Telephone Number (Include Area Code) _____  | <b>22. FLSA</b><br>E—Exempt<br>N—Nonexempt  |
| <b>6. List Dates and Branch of All Active Military Service</b><br>From: _____ To: _____ Branch: _____<br>Kind of Discharge: <input type="checkbox"/> Honorable <input type="checkbox"/> Other (Explain on plain piece of paper) _____<br>If ever convicted by a general court-martial, on plain paper give 1) date, 2) charge, 3) place, 4) court, and 5) action taken.                                       | <b>23. Retirement</b><br>2—FICA<br>4—None<br>5—Other  |
| <b>7. If you have had Federal civilian service, give total time worked:</b><br>Years: _____ Months: _____ Days: _____<br>Give on plain paper the name and address of the last agency you worked for and date of separation.   | <b>24. Annuitant Indicator</b><br>1—Reempl. Ann. — CS      4—RETO & CS<br>2—RETO      5—REIM & CS<br>3—REIM      9—Not Applicable   |
| <b>8. Are you a citizen of the United States? If "No," give country of which you are a citizen:</b> YES NO  | <b>25. Work Schedule</b><br>F—Full-time      G—FT Seasonal<br>P—Part-time      Q—PT Seasonal<br>I—Intermittent      J—INT Seasonal  |
| <b>9. Are you now employed by a Federal agency, or are you receiving a lump-sum payment from a Federal agency for leave extending into the date of this statement?</b>  | <b>26. Effective Date</b> _____   |
| <b>10. Do you receive, or have you ever applied for retirement pay, pension, or other pay based on military, Federal civilian, or District of Columbia Government services?</b>   | <b>27. Not-to-Exceed Date</b> _____   |
| <b>11. During the last 10 years, were you fired from any job for any reason, did you quit after being told that you would be fired, or did you leave by mutual agreement because of specific problems? If "Yes," write on plain paper for each job: a) the name of the employer; b) the approximate date you left the job; and c) the reason(s) why you left.</b>   | <b>28A. Nature of Action Code</b><br><b>171</b>   |
| <b>12. When answering questions A, B, C, and D you may omit: 1) traffic fines of \$100.00 or less; 2) any violation of law committed before your 18th birthday, if finally decided in juvenile court or under a youth offender law; 3) any conviction set aside under the Federal Youth Corrections Act or similar State law; and 4) any conviction where record was expunged under Federal or State law.</b> | <b>28B. Nature of Action</b><br><b>EXCEPTED APPOINTMENT</b>   |
| <b>A. Have you ever been convicted of or forfeited collateral for any felony?</b><br>A felony is defined as any violation of law punishable by imprisonment of longer than one year, except for violations called misdemeanors under State law which are punishable by imprisonment of two years or less.   | <b>29A. Authority Code</b><br><b>XZM</b>  |
| <b>B. Have you ever been convicted of or forfeited collateral for any firearms or explosives violation?</b>   | <b>29B. Authority</b><br><b>SCHEDULE A213.3114 (d) (1)</b>  |
| <b>C. During the last 10 years have you forfeited collateral, been convicted, been imprisoned, been on probation, or been on parole? Do not include violations reported in A or B above.</b>  | <b>29C through 31D not applicable</b>   |
| <b>D. Are you now under charges for any violation of law? IF YOU ANSWERED "YES" TO ANY PART OF ITEM 12, GIVE DETAILS ON A SEPARATE SHEET OF PLAIN PAPER. For each violation write the: 1) date; 2) charge; 3) place; 4) court; and 5) action taken.</b>   | <b>32. Position Title and Number</b>  |
| <b>13. Do any of your relatives work for the United States Government or United States Armed Forces? (See instructions and list of relatives on the back of the last copy of this form.)</b>  | <b>33. Pay Plan and Occupational Code</b><br><b>AD-0303</b>   |
| <b>14. List on plain paper any trade or profession in which you hold a license or certification, the State in which it was issued, and the name of the issuing organization.</b>  | <b>34. Grade or Level</b><br><b>00</b>  |
| <b>15. I certify that all of the statements made in this application are true, complete, and correct to the best of my knowledge and belief.</b>  | <b>35. Step or Rate</b><br><b>00</b>  |
| <b>16. I SWEAR (or affirm) to the oath and the appointment affidavits on the reverse of this form.</b>  | <b>36. Salary</b> *   |
| <b>17. SUBSCRIBED AND SWORN (or affirmed) before me on this _____ day of _____ A.D. 19 _____</b>  | <b>37. Pay Basis</b><br><b>PER HOUR</b>   |
| Applicant's Signature and Date Signed _____   | <b>38. Name and Location of Employing Office</b><br><b>BUREAU OF THE CENSUS — FIELD DIVISION</b>  |
| Applicant's Signature _____   | <b>39. Duty Station (City, County, State)</b>   |
| (Signature and Title of Officer Authorized to Administer Oath) _____  | <b>CPDF DATA</b>  |
| _____   | <b>40A. VEV Ind.</b> <b>40B. PRD</b> <b>40C. Barg. Unit Status</b> <b>40D. Functional Class</b><br>_____ <b>0</b> _____ <b>00</b>   |
| _____   | <b>40E. Agency Code</b> <b>40F. Location Code</b><br><b>CM 63</b>   |
| _____   | <b>40G. SON</b>   |
| _____   | <b>41. Remarks — No regular tour of duty during each administrative work week (Sunday through Saturday); not entitled to earn leave; not to work in excess of 8 hours per day, or 40 hours per week unless authorized in advance.</b>   |
| _____   | <b>* Enumerator training for listing, nonresponse, list/enumerate, update/leave, and S-night is paid at minimum wage; may receive additional pay for completion of first review and enumeration.</b>  |
| _____   | County _____  |
| _____   | <b>TAXING AUTHORITY CODE:</b>   |
| _____   | <b>TAX WITHHOLDING INSTRUCTIONS:</b> Federal      State      Local<br>(1) Filing Status (Circle one)      M      S      M      S      R      N<br>(2) Number of Exemptions _____<br>(3) Dollar Allowance/Percent _____%<br>(4) Exempt from all withholding — Mark (X) box _____ COLA _____% |
| _____   | <b>WITHHOLDING STATEMENT</b><br>Under penalties of perjury, I certify that I am entitled to the number of withholding allowances claimed on this certificate, or if claiming exemption from withholding, that I am entitled to claim the exempt status.                                     |
| _____   | Employee's signature _____ Date _____   |
| _____   | <b>42. Signature/Authentication and Title of Approving Official</b>   |
| _____   | <b>43. Date</b>   |
| _____   | <b>44. Name of Employing Department or Agency</b><br><b>DEPARTMENT OF COMMERCE</b>  |

1—EMPLOYEE COPY

THE FEDERAL GOVERNMENT IS AN EQUAL OPPORTUNITY EMPLOYER

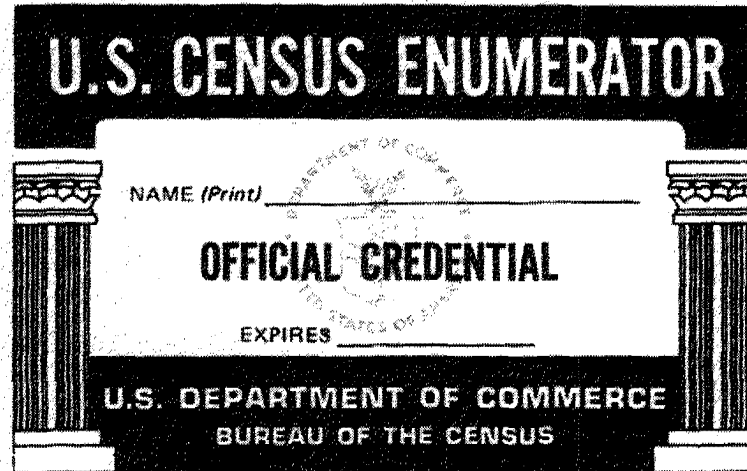
**U.S. CENSUS ENUMERATOR**

NAME (Print) \_\_\_\_\_

**OFFICIAL CREDENTIAL**

EXPIRES \_\_\_\_\_

**U.S. DEPARTMENT OF COMMERCE**  
**BUREAU OF THE CENSUS**

The image shows a rectangular official credential card. At the top, a black banner contains the text "U.S. CENSUS ENUMERATOR" in white, bold, sans-serif font. Below this banner is a white rectangular area with a decorative border of two classical columns on either side. Inside this white area, the text "NAME (Print)" is followed by a horizontal line. Below that, the words "OFFICIAL CREDENTIAL" are printed in a large, bold, sans-serif font. Underneath, the word "EXPIRES" is followed by another horizontal line. At the bottom of the white area, the text "U.S. DEPARTMENT OF COMMERCE" and "BUREAU OF THE CENSUS" is printed in a bold, sans-serif font. A faint circular seal of the U.S. Department of Commerce is visible in the background of the white area.

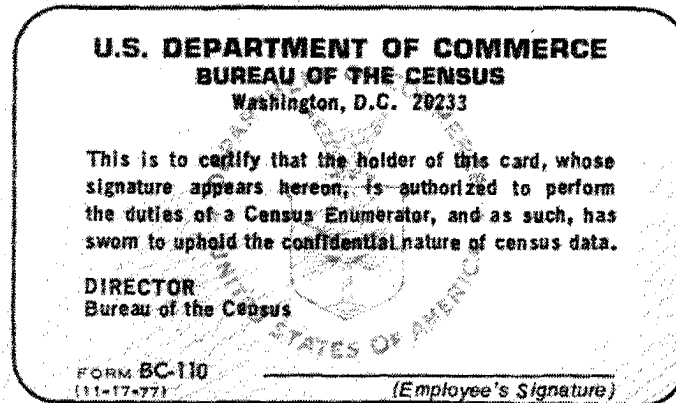
**U.S. DEPARTMENT OF COMMERCE**  
**BUREAU OF THE CENSUS**  
Washington, D.C. 20233

This is to certify that the holder of this card, whose signature appears hereon, is authorized to perform the duties of a Census Enumerator, and as such, has sworn to uphold the confidential nature of census data.

**DIRECTOR**  
Bureau of the Census

FORM BC-110  
(11-17-77)

\_\_\_\_\_  
(Employee's Signature)

The image shows a rounded rectangular certification card. At the top, the text "U.S. DEPARTMENT OF COMMERCE", "BUREAU OF THE CENSUS", and "Washington, D.C. 20233" is printed in a bold, sans-serif font. Below this, a paragraph of text certifies the holder's authorization as a Census Enumerator. Underneath the paragraph, the title "DIRECTOR" and "Bureau of the Census" are printed. At the bottom left, the text "FORM BC-110" and "(11-17-77)" is printed. At the bottom right, there is a horizontal line followed by the text "(Employee's Signature)". A faint circular seal of the U.S. Department of Commerce is visible in the background.

**NOTICE****RESTRICTIONS ON THE POLITICAL ACTIVITY OF EMPLOYEES**

The Hatch Political Activity Act and the rules which govern the political activity of employees of the executive branch of the Federal Government prohibit the use of official authority or influence for the purpose of interfering with an election or affecting its results, and taking an active part in political management or in political campaigns. All employees have the right to vote as they please and the right to express their opinion, as individuals, on all political subjects and candidates.

Summarized are some of the principal "do's" and "don'ts" in the area of political activities. More complete and detailed information is provided in the Department of Commerce Administrative Order 202-733.

All full-time, part-time, mixed tour, and temporary employees are subject to these political activity restrictions at all times including leaves of absence, with or without pay. Persons employed on an intermittent basis or without compensation or mixed tour employees in an intermittent status are subject to the political activity restrictions of the law for the entire 24 hours of any day of actual employment.

Among the forms of political activity which are permitted and prohibited are:

**PERMISSIBLE ACTIVITIES**

*You may:*

1. Register and vote in any election;
2. Express your opinion as an individual citizen, privately and publicly, on political subjects and candidates;
3. Display a political picture, sticker, badge or button except when carrying out official business involving contact with the public (for example, a census interviewer, receptionist, etc.);
4. Participate in the nonpartisan activities of a civic, community, social, labor, professional, or similar organization;
5. Be a member of a political party or other political organization and participate in its activities to the extent consistent with law;
6. Attend a political convention, rally, fund-raising function, or other political gathering;
7. Sign a political petition as an individual citizen;
8. Make a financial contribution to a political party organization;
9. Take an active part, as an independent candidate or in support of an independent candidate, in a partisan election covered by subchapter 4 of Federal Personnel Manual Chapter 733;
10. Take an active part, as a candidate or in support of a candidate, in a nonpartisan election;
11. Be politically active in connection with a question which is not specifically identified with a political party, such as constitutional amendment, referendum, approval of a municipal ordinance, or any other question or issue of a similar character;
12. Serve as an election judge or clerk, or in a similar position to perform nonpartisan duties as prescribed by State or local law; and
13. Otherwise participate fully in public affairs, except as prohibited by law, in a manner which does not materially compromise your efficiency or integrity as an employee or the neutrality, efficiency, or integrity of your agency.

None of these permissible activities authorizes an employee to engage in political activity in violation of law, while on duty, or while in a uniform that identifies him/her as an employee. The head of an agency may prohibit or limit the participation of an employee or class of employees of the agency in the activities permitted if participation in the activity would interfere with the efficient performance of official duties, or create a conflict or apparent conflict of interest.

**PROHIBITED ACTIVITIES**

*You may not:*

1. Serve as an officer of a political party, a member of a national, State, or local committee of a political party, an officer or member of a committee of a partisan political club, or be a candidate for any of these positions;
2. Organize or reorganize a political party organization or political club;
3. Directly or indirectly solicit, receive, collect, handle, disburse, or account for assessments, contributions, or other funds for a partisan political purpose or in connection with a partisan election;
4. Organize, sell tickets to, seek support for, or actively participate in a fund-raising activity of a political party or political club;
5. Take an active part in managing the political campaign of a candidate for public office or political party office;
6. Be a candidate for, or campaign for, an elective public office;
7. Take an active part in an organized solicitation of votes in support of or in opposition to a candidate for public office or political party office;
8. Act as recorder, watcher, challenger, or similar officer at the polls on behalf of a political party or a candidate in a partisan election;
9. Drive voters to the polls on behalf of a political party or a candidate in a partisan election;
10. Endorse or oppose a candidate in a partisan election in a political advertisement, a broadcast, campaign literature, or similar material;
11. Serve as a delegate, alternate, or proxy to a political party convention;
12. Address a State or national convention or caucus, or a rally or similar gathering of a political party in support of or in opposition to a candidate for public or political party office, or on a partisan political question; and
13. Initiate or circulate a nominating petition for a candidate in a partisan election.

**EXCEPTION OF CERTAIN ELECTIONS**

The Office of Personnel Management is authorized to issue regulations permitting Federal employees, who live in a municipality or other political subdivision in the immediate vicinity of the District of Columbia, in the States of Maryland and Virginia, or in municipalities where the majority of voters are employed by the Federal Government, to take part in political management and political campaigns in connection with partisan elections for local offices.

**FOR ASSISTANCE**

Requests for information concerning the designated localities discussed above and other inquiries should be directed to the Employee Services and Performance Management Branch, Personnel Division, or to the servicing personnel office.

## Your Answers Are Confidential

The Bureau of the Census is now taking the 1990 Census of the United States. This census marks the 200th year since the first United States census. Thank you for taking part--your help is important to the Nation and your community.

For the next 72 years, or until April 2062, only sworn Census Bureau workers--and no one else--will have access to your individual census questionnaire. The collection of census information is authorized by a law\* that protects the confidentiality of your answers. This law also requires that you furnish the information requested.

# CENSUS '90



The 1990 census will benefit you and your community. Census results will be used to . . .

. . . determine the number of representatives your State will have in Congress, define your electoral district, and redistrict seats in your State legislature.

. . . distribute Federal, state, and local funds for education, housing, health services, transportation planning, job training, public works, and other important programs.

. . . meet the challenges of the next decade by profiling our changing Nation--its people, its housing, its growth.

Thank you for making the 1990 census--the Bicentennial Census--the best in our history.

Comments about the estimated time required to complete the census form should be directed to the Associate Director for Management Services, Bureau of the Census, Washington, DC 20233, Attn: CEN-90, and to the Office of Management and Budget, Paperwork Reduction Project CEN-90, Washington, DC 20503.

U.S. Department of Commerce  
BUREAU OF THE CENSUS

**Para la traducción al español, véase al dorso.**

**D-31** (1-89)

\* Title 13, United States Code, Sections 141 and 221.

D-103A (ADP). Address Listing Page—Nonresponse Followup

| THIS LISTING CONTAINS INFORMATION. THE RELEASE OF WHICH IS PROHIBITED BY TITLE 13, U.S.C. |                  |                   |            |                                  |                  |                     |                 |                        |   |                          |                       |  |                 |
|---|------------------|-------------------|------------|----------------------------------|------------------|---------------------|-----------------|------------------------|---|--------------------------|-----------------------|--|-----------------|
| (15)<br>DO: 3049  |                  | (16)<br>ARA: 1001 |            | (17) (18)<br>CTY/BNA: 136/990200 |                  | (19)<br>ANYTOWN     |                 | ZIP: 75100 ANYTOWN, TX |   | (20)<br>PAGE 2 OF 3      |                       |  |                 |
| STATUS<br>(1)   | COMP DATE<br>(2) | CL INITIAL<br>(3) | CDE<br>(4) | ID NUMBER<br>(5)                 | FORM TYPE<br>(6) | BLOCK NUMBER<br>(7) | MAP SPOT<br>(8) | HOUSE NUMBER<br>(9)    | STREET/ROAD NAME OR RR & BOX NUMBER OR PO BOX<br>(10) | UNIT DESIGNATION<br>(11) | OCCUPANT NAME<br>(12) | LOCATION DESCRIPTION<br>(13)               | REMARKS<br>(14) |
|   |                  |                   | NR         | 100 6029                         | S                | 203                 | 1               | 564                    | N MULBERRY ST 75100                                   |                          |                       |  |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 6030                         | S                | 204                 | 1               |                        | CRESTVIEW TERR<br>RR 1 BX 17 75100                    | TRLR                     | E ZUDD                | WHT TRLR 2 MI E<br>OF N MULBERRY ST        |                 |
|   |                  |                   | NR         | 100 6031                         | S                | 204                 | 2               |                        | CRESTVIEW TERR<br>RR 1 BX 17 75100                    | TRLR                     |                       | BRN TRLR 4 MI E<br>OF N MULBERRY ST        |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 6032                         | S                | 204                 | 3               |                        | RR 1 BX 18 75100                                      |                          | E ANDREWS             | WHT MSE ED'S<br>TRLR PARK                  |                 |
|   |                  |                   | NR         | 100 6033                         | S                | 204                 | 4               |                        | RR 1 BX 18 75100                                      | TRLR                     |                       | TRLR SITE NEXT TO MSE<br>IN ED'S TRLR PARK |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 6034                         | L                | 204                 | 5               |                        | RR 1 BX 18 75100                                      | TRLR                     | J THOMPSON            | BRN TRLR WHT FENCE<br>ED'S TRLR PARK       |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 6035                         | S                | 204                 | 6               |                        | RR 1 BX 18 75100                                      | TRLR                     |                       | BL & WHT TRLR<br>ED'S TRLR PARK            |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 6036                         | S                | 204                 | 7               |                        | RR 1 BX 18 75100                                      | TRLR                     | C SEVERN              | CR TRLR BAY WINDOW<br>ED'S TRLR PARK       |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 4037                         | S                | 204                 | 8               |                        | RR 1 BX 75100   | TRLR                     | P PHELPS              | TAN TRLR W/PATIO<br>ED'S TRLR PARK         |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 5038                         | S                | 204                 | 9               |                        | RR 1 BX 18 75100                                      | TRLR                     | C SHOW                | BL TRLR YLW TRIM<br>ED'S TRLR PARK         |                 |
|   |                  |                   | NR         | 100 6039                         | S                | 204                 | 10              |                        | RR 1 BX 18 75100                                      | TRLR                     | R CHRISTIE            | WHT TRLR BL SHUTTERS<br>ED'S TRLR PARK     |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 6040                         | L                | 204                 | 11              |                        | RR 1 BX 18 75100                                      | TRLR                     | J JOHNSON             | GR TRLR TLW DOORS<br>ED'S TRLR PARK        |                 |
|   |                  |                   | NR         | 100 6041                         | S                | 204                 | 12              |                        | RR 1 BX 18 75100                                      | TRLR                     | R WALTON              | GRAY TRLR WHT TRIM<br>ED'S TRLR PARK       |                 |
|   |                  |                   | NR         | 100 6042                         | S                | 204                 | 13              |                        | RR 1 BX 18 75100                                      | TRLR                     |                       | BL & RED TRLR<br>ED'S TRLR PARK            |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 6054                         | S                | 205                 | 1               | 549                    | E THIRD ST 75100                                      |                          |                       |  |                 |
|   |                  |                   | NR         | 100 6055                         | S                | 205                 | 2               | 517                    | E THIRD 75100   |                          |                       |  |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 6056                         | S                | 205                 | 3               | 330                    | N PRESCOTT ST 75100                                   |                          |                       |  |                 |
| XXXXX   | XXXXXX           | XXXXX             | xx         | 100 6057                         | L                | 205                 | 4               | 358                    | N PRESCOTT ST 75100                                   |                          |                       |  |                 |



FORM **D-116A(1/6)**  
(3-18-88)

**GROUP QUARTERS SAMPLING PAGE**  
**21st Decennial Census — 1990**

| GQ name<br>(1) | GQ ID number<br>(2) | GQ code<br>(3)  | Room<br>number<br>(4a) | Person's name<br>(4b) | Person<br>number<br>(4c) | Type of<br>form<br>(5) | Check-in <sup>1</sup><br>(6) |   |   |
|----------------|---------------------|---|------------------------|-----------------------|--------------------------|------------------------|------------------------------|---|---|
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | L                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | L                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | S                      | UHE                          | I | C |
|                |                     | <input type="checkbox"/> I <input type="checkbox"/> N |                        |                       |                          | L                      | UHE                          | I | C |

<sup>1</sup>UHE" Usual Home Elsewhere, "I" Incomplete ICR, "C" Complete ICR. See your Group Quarters Enumerator's Manual.



|   |   |   |                        |   |  |   |
|---|---|---|------------------------|---|--|---|
| FORM <b>D-160</b><br>(6-21-89)  | U.S. DEPARTMENT OF COMMERCE<br>BUREAU OF THE CENSUS | <b>NOTICE</b> — Your answers are <b>confidential</b> . The law (title 13, United States Code) requires that you answer the questions to the best of your knowledge.   |                        |   |  |   |
| <h2 style="margin: 0;">VACANT/DELETE REVIEW</h2> <h3 style="margin: 0;">21st Decennial Census — 1990</h3> |   | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;"><b>OFFICE USE ONLY</b></td> <td style="text-align: center; padding: 2px;">V</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="text-align: center; padding: 2px;">D</td> </tr> </table> | <b>OFFICE USE ONLY</b> | V |  | D |
| <b>OFFICE USE ONLY</b>  | V   |   |                        |   |  |   |
|   | D   |   |                        |   |  |   |

**Section A — IDENTIFICATION**

|                         |           |  |              |                                 |  |
|-------------------------|-----------|--|--------------|---------------------------------|--|
| 1. DO No.               | 2. ID No. | 3. ARA No.   | 4. Block No. | 5. Map spot No. (Non-TAR areas) | 6. Type of form<br><input type="checkbox"/> S <input type="checkbox"/> L |
| 7. Address              |           | House No.      Street, rural route and box No., or lockbox No. |              |                                 | Unit   |
|                         |           | Post office name or city                                       |              | State                           | ZIP Code   |
| 8. Location description |           |  |              |                                 |  |
|                         |           |  |              |                                 |  |

**Section B — PRESENT STATUS OF UNIT**

**1. Occupied** — Conduct the interview in section C.

**2. Vacant** — Speak to a knowledgeable person to verify that the unit is vacant.

● If original status is vacant — Complete section D.

● If original status is delete — Fill appropriate census questionnaire. Complete section D.

**3. Delete** — Speak to a knowledgeable person to verify that the unit does not exist. Complete section D.

**Section C — UNIT NOW OCCUPIED**

**READ** ▶ I am (Your name) from the U.S. Bureau of the Census; here is my identification. We are checking addresses in the area to make sure everyone was counted in the 1990 census.

1. When did (your/this) family move to this address? Enter date →

|  |       |     |      |
|--|-------|-----|------|
|  | Month | Day | Year |
|--|-------|-----|------|

2. **ENUMERATOR CHECK ITEM**

On or before April 1, 1990 — Fill the appropriate census questionnaire. Complete section D.

After April 1, 1990 — Continue with question 3.

3. Was a 1990 census questionnaire completed for this family?

Yes — Complete section D.     No — Fill an appropriate census questionnaire for a "mover — UHE" household as directed in your manual. Complete section D.

**Section D — ENUMERATOR CONTROL**

(If you filled a census questionnaire, enclose this form inside the questionnaire after completing this section.)

**Privacy Act Notice** — All information furnished will be treated in accordance with the Privacy Act of 1974. No information will be released except as authorized by the Act.

|                                 |                                      |   |  |
|---------------------------------|--------------------------------------|---|--|
| 1. Enumerator name              |                                      | 2. CLD No.  |  |
| 3. Date of interview            | 4. Time of interview<br>a.m.<br>p.m. | 5. Status<br><input type="checkbox"/> Complete <input type="checkbox"/> LAST RESORT — Explain to crew leader      |  |
| 6. Person providing information | a. Name                              | c. <input type="checkbox"/> Occupant <input type="checkbox"/> Other — Specify <u>      </u>                       |  |
|                                 | b. Telephone No.                     | <input type="checkbox"/> Neighbor<br><input type="checkbox"/> Owner/manager<br><input type="checkbox"/> Custodian |  |

Notes

\_\_\_\_\_

\_\_\_\_\_

D-204. Cost and Progress Report (Number 1)

U.S. DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS

DISTRICT OFFICE REPORT NO. 1: EMPLOYEE BREAKDOWN

Report Date: 06/08/89  
 District Office Number: 3009  
 Operation: (Name of Operation)  
 Operation Code: 72

| Name<br>Enumerator<br>(or clerk) | CLD #<br>(or SOC) | Cases/<br>Hour | Recent<br>Cases/<br>Day | Total<br>Cases/<br>Day | Low<br>Prod | Miles/<br>Case | High<br>Miles | Other<br>Costs/<br>Day | Employee<br>Status |
|----------------------------------|-------------------|----------------|-------------------------|------------------------|-------------|----------------|---------------|------------------------|--------------------|
| (1)                              | (2)               | (3)            | (4)                     | (5)                    | (6)         | (7)            | (8)           | (9)                    | (10)               |
| Epstein, David                   | 85                | 7.9            | 50.2                    | 56.1                   |             | 0.5            |               | .08                    | W                  |
| Evans, Julia                     | 85                | 8.9            | 60.0                    | 60.3                   |             | 0.1            |               | .02                    | S                  |
| Gibson, Hannah                   | 85                | 10.0           | 59.4                    | 75.4                   |             | 0.3            |               | .02                    | W                  |
| Kirkpatrick, Alan                | 85                | 9.2            | 69.6                    | 70.0                   |             | 0.4            |               | .05                    | W                  |
| Leonard, John                    | 85                | 6.2            | 22.2                    | 40.3                   | *           | 0.4            |               | .06                    | W                  |
| Mendez, Raul                     | 85                | 9.3            | 60.8                    | 75.3                   |             | 0.2            |               | .17                    | W                  |
| Newsome, Cheryl                  | 85                | 14.5           | 64.6                    | 87.6                   |             | 0.3            |               | .11                    | W                  |
| O'Hara, Mark                     | 85                | 8.9            | 64.0                    | 70.1                   |             | 2.8            | *             | .02                    | W                  |
| Robbins, Elizabeth               | 85                | 7.5            | 40.2                    | 51.6                   |             | 0.6            |               | .08                    | S                  |
| Wilson, Sharon                   | 85                | 11.3           | 77.7                    | 80.9                   |             | 0.3            |               | .16                    | W                  |
| Crew leader Totals               | 85                | 9.9            | 51.6                    | 65.8                   |             | 0.2            |               | .04                    |                    |

PRINT HARD - USE BLUE OR BLACK BALLPOINT PEN - SEE INSTRUCTION ON REVERSE

Sheet \_\_\_\_\_ of \_\_\_\_\_ sheets

|   |   |  |   |
|---|---|--|---|
| FORM D-308<br>(9-12-88)   | U.S. DEPARTMENT OF COMMERCE<br>BUREAU OF THE CENSUS | 1. Social Security number<br>_____   | 2. Name (Last, First, Middle initial)<br>_____  |
| <b>DAILY PAY AND WORK RECORD</b><br><b>21st Decennial Census - 1990</b> |   | 3. Type of employee<br>Mark (X) one  |   |
|   |   | 01 <input type="checkbox"/> Enumerator<br>02 <input type="checkbox"/> Crew leader<br>03 <input type="checkbox"/> Field Operations Supervisor | 04 <input type="checkbox"/> Office - supervisory<br>05 <input type="checkbox"/> Office - nonsupervisory |

|  |                                |  |                        |
|--|--------------------------------|--|------------------------|
| <b>Privacy Act Notice</b> - All information furnished will be treated in accordance with the Privacy Act of 1974. No information will be released except as authorized by the Act. | 4. Hourly pay rate<br>\$ _____ | 5. Name of operation - Specify -<br>a. _____<br>b. _____ | <b>Office Use Only</b> |
|--|--------------------------------|--|------------------------|

|   |  |                      |                     |
|---|--|----------------------|---------------------|
| <b>WARNING AGAINST FALSE, FICTITIOUS, OR FRAUDULENT CLAIMS</b> - Whoever knowingly makes a false, fictitious, or fraudulent claim against the U. S. Government shall be subject to a fine, imprisonment, or both. | 6a. District Office (DO) name<br>_____ | 6b. DO Code<br>_____ | 7. CLD No.<br>_____ |
|---|--|----------------------|---------------------|

| 8a. Day worked | 8b. Month   Day   Year | 9a. Operation code | 9b. Hours worked |         |     |     |     |     | 9c. Office Use Only |     | 10. Miles driven | 11. Telephone expenses (See Section IIIA) | 12. Other expenses (See Section IIIB) | 13. Per diem (See attached D-308A) |
|----------------|------------------------|--------------------|------------------|---------|-----|-----|-----|-----|---------------------|-----|------------------|---|---------------------------------------|------------------------------------|
|                |                        |                    | TNG @ \$3.35+    | OTH TNG | REG | OT  | ND  | NDO | (1)                 | (2) |                  | \$ .                                      | \$ .                                  | \$ .                               |
|                |                        |                    | (1)              | (2)     | (3) | (4) | (5) | (6) |                     |     |                  | \$ .                                      | \$ .                                  | \$ .                               |

|   |   |
|---|---|
| <b>Section I - CASES COMPLETED AND INCLUDED IN THIS RECORD (TO BE FILLED BY SUPERVISOR)</b> | <b>Section II - SUPPLEMENTAL PAYMENTS (IF AUTHORIZED)</b> |
|---|---|

| OPERATION CODE (A) | OPERATIONS          |                     | Item (a)        | Operation code (b) | Authorizing official signature (c) | Amount (d) |
|--------------------|---------------------|---------------------|-----------------|--------------------|------------------------------------|------------|
|                    | Cases completed (1) | Office Use Only (2) |                 |                    |                                    |            |
|                    |                     |                     | 1. First review |                    |                                    | \$ .       |
|                    |                     |                     | 2. Enumeration  |                    |                                    | \$ .       |

**Section III - EXPENSES (PROVIDE DETAIL FOR EXPENSES SHOWN IN ITEMS 11 AND 12 ABOVE)**

| A. TELEPHONE EXPENSES    |                   |  |                   |                            | B. OTHER EXPENSES<br><i>(Road, bridge, or ferry tolls; parking fees; common carrier fees paid in cash; other miscellaneous items. You must include receipts.)</i> |                                 |  |                            |    |
|--------------------------|-------------------|--|-------------------|----------------------------|---|---------------------------------|--|----------------------------|----|
| Local calls              |                   | Toll calls                               |                   | Cost by operation code (5) |   | Description of expenditures (1) |  | Cost by operation code (2) |    |
| Number of cash calls (1) | Cost per call (2) | Places between which calls were made (3) | Cost per call (4) |                            |   |                                 |  |                            |    |
|                          |                   |  |                   | \$                         | \$  |                                 |  | \$                         | \$ |
|                          |                   |  |                   | \$                         | \$  |                                 |  | \$                         | \$ |
|                          |                   |  |                   | \$                         | \$  |                                 |  | \$                         | \$ |

| Section IV - TIMES OF DAY WORKED              | Section V - REMARKS |
|---|---------------------|
| FROM a.m.   a.m.   a.m.<br>p.m.   p.m.   p.m. |                     |
| TO a.m.   a.m.   a.m.<br>p.m.   p.m.   p.m.   |                     |

| Section VI - CHANGE OF ADDRESS/LAST WORKDAY/FIRST WORKDAY |   |                |          |
|---|---|----------------|----------|
| Mark (X) appropriate box                                  | 01 <input type="checkbox"/> New mailing address - Enter here -> | Street address |          |
|   | 02 <input type="checkbox"/> Employee's last workday             | City           |          |
|   | 03 <input type="checkbox"/> Employee's first workday            | State          | ZIP Code |

| Section VII - CERTIFICATION STATEMENTS   |                         |      |
|--|-------------------------|------|
| EMPLOYEE'S CERTIFICATION - I certify that this information is true and correct; that I have (1) worked the hours indicated, (2) claimed reimbursements including telephone charges incurred only on official business, and (3) completed the work indicated in accordance with instructions. | Signature of employee   | Date |
| SUPERVISOR'S CERTIFICATION - I certify that I have reviewed the materials submitted and that the work has been done satisfactorily. The amounts shown for hours worked, miles driven, and other expenses should be paid.   | Signature of supervisor | Date |

| FOR OFFICE USE ONLY | Section VIII - AUDITED BY |
|---------------------|---------------------------|
|                     | Signature of auditor      |
|                     | Date                      |

Copy distributed by: WHITE - RCC Payroll    YELLOW - DO Payroll    PINK - DO Manager    GOLDENROD - Employee

D-351. Special Place Prelist Record

OMB No. 0607-0621: Approval Expires 12/31/90

|   |  |   |                       |   |                   |   |
|---|--|---|-----------------------|---|-------------------|---|
| <b>NOTICE</b> — Your report to the Census Bureau is <b>confidential</b> by law (title 13, U.S. Code). It may be seen only by sworn Census employees and may be used only for statistical purposes.  |  | District Office name  |                       | Code  |                   |   |
| FORM <b>D-351</b><br>(12-13-88)   |  | U.S. DEPARTMENT OF COMMERCE<br>BUREAU OF THE CENSUS   |                       | <b>Section A. IDENTIFICATION</b>  |                   |   |
| <b>SPECIAL PLACE PRELIST RECORD</b><br><br><b>21st Decennial Census — 1990</b>  |  | 1. ARA number   |                       | 2. Block number   |                   |   |
|   |  | 3. Map spot number (Do not fill if ARA is 4001–5999.)   |                       | 4. Special place ID number  |                   |   |
|   |  | CHECK ITEM 1<br>Are ARA and block numbers correctly filled?   |                       | <input type="checkbox"/> Yes — Go to section B<br><input type="checkbox"/> No — Correct or fill as necessary, then go to section B  |                   |   |
| <b>Section B. SPECIAL PLACE ADDRESS</b>   |  |   |                       |   |                   |   |
| 1. Special place name   |  |   |                       | CHECK ITEM 2<br>Are ALL address entries correct and complete?<br><br><input type="checkbox"/> Yes — Go to section C<br><input type="checkbox"/> No — Correct or fill as necessary, then go to section C |                   |   |
| 2a. Mailing address (House No. and street name, or rural route (RR) and box No., or PO box No.)   |  |   |                       |   |                   |   |
| b. Physical location (If above is NOT a house number)   |  |   |                       |   |                   |   |
| 3. Post Office name (Include State)   |  |   | ZIP Code              |   |                   |   |
| <b>Section C. PRELIST CONTACT PERSON</b>  |  |   |                       |   |                   |   |
| 1. Name   |  | 2. Title or position  |                       | 3. Telephone number (Include area code)   |                   |   |
| <b>Section D. STATUS</b>  |  |   |                       |   |                   |   |
| MARK (X) ONLY ONE BOX<br>1. <input type="checkbox"/> Special place (other than Travel place) with one or more housing units and/or group quarters — Go to section E, items 2–11.<br>2. <input type="checkbox"/> Travel place — Go to section E, item 1.<br>3. <input type="checkbox"/> Not a special place, but contains one or more housing units — SKIP to section F. Describe the place (such as "Convent with fewer than 10 unrelated persons" or "Apartment building"). Then list all HUs on a form D-351(HU).<br>4. <input type="checkbox"/> No housing units or group quarters at address — SKIP to section F. Explain, such as "Vacant lot" or "Gas station only," then END INTERVIEW.<br>5. <input type="checkbox"/> Another prelist record already completed for this place — Copy ID number from item A4 of the other prelist record to section F below, then END INTERVIEW. |  |   |                       |   |                   |   |
| <b>Section E. TYPE OF SPECIAL PLACE</b>   |  |   |                       |   |                   |   |
| 1. <input type="checkbox"/> TRAVEL PLACE<br><br>a. <input type="checkbox"/> Hotels, motels, and tourist homes charging more than \$12 per night and all marinas — Follow (1) below only<br><br>b. <input type="checkbox"/> Youth hostels, YMCAs, YWCAs, racetracks, and commercial and public campgrounds — Ask: <b>Will this place be open for business on March 31?</b><br><input type="checkbox"/> Yes — Follow both (1) and (2) below<br><input type="checkbox"/> No — Follow (1) below only  |  | ENUMERATOR: Mark (x) one box.<br>2. <input type="checkbox"/> BOARDING OR ROOMING HOUSE with 10 or more unrelated persons<br>3. <input type="checkbox"/> COLLEGE OR UNIVERSITY<br>4. <input type="checkbox"/> CONVENT, MONASTERY, OR RECTORY with 10 or more unrelated persons<br>5. <input type="checkbox"/> CORRECTIONAL FACILITY of any type<br>6. <input type="checkbox"/> DORMITORY FOR FARM OR NONFARM WORKERS<br>7. <input type="checkbox"/> GROUP HOME with 10 or more unrelated persons<br>8. <input type="checkbox"/> HOSPITAL of any type |                       |   |                   |   |
| ENUMERATOR:<br>(1) List each permanent unit in section H on form D-351(HU)<br>(2) Fill a D-351(GQ) for the place, using 94-N as the GQ code   |  | 9. <input type="checkbox"/> NURSING HOME OR HOME FOR THE AGED<br>10. <input type="checkbox"/> S-NIGHT PLACE of any type — Hotels, motels, and tourist homes charging \$12 or less per night and all homeless shelters<br>11. <input type="checkbox"/> OTHER TYPE OF SPECIAL PLACE — Specify type <u>      </u>  |                       | ENUMERATOR: Fill D-351(GQ) and/or D-351(HU) forms.  |                   |   |
| <b>Section F. NOTES</b>   |  |   |                       |   |                   |   |
| _____<br>_____<br>_____   |  |   |                       |   |                   |   |
| <b>OFFICE USE ONLY</b>  |  | CLD number (a)  | Assignment number (b) | Date assigned (c)   | Date returned (d) | Status Mark (X) one box (e)   |
| 1. Special Place Prelist assignment   |  |   |                       |   |                   | <input type="checkbox"/> Accept<br><input type="checkbox"/> Fail<br><input type="checkbox"/> Repair |
| 2. T-Night assignment   |  |   |                       |   |                   |   |

Copy distribution after office completes: } Special Place Prelist: **WHITE/YELLOW** — Enumerator  
 T-Night: **WHITE** — District Office **YELLOW** — Enumerator

D-351 (GQ). Special Place Group Quarters Address Sheet

OMB No. 0607-0621: Approval Expires 12/31/90

|   |                                      |                                |   |  |
|---|--------------------------------------|--------------------------------|---|--|
| <p><b>NOTICE</b> — Your report to the Census Bureau is <b>confidential</b> by law (title 13, U.S. Code). It may be seen only by sworn Census employees and may be used only for statistical purposes.</p> <p>FORM <b>D-351(GQ)</b><br/>(7-21-88)</p> <p>U.S. DEPARTMENT OF COMMERCE<br/>BUREAU OF THE CENSUS</p> <p align="center"><b>SPECIAL PLACE GROUP<br/>QUARTERS ADDRESS SHEET</b><br/>21st Decennial Census — 1990</p> | <b>A. District Office name</b> _____ |                                | <b>Code</b> _____                         |  |
|   | <b>OFFICE USE ONLY</b>               |                                |   |  |
|   | <b>B. Page</b> _____                 |                                | <b>C. Source</b><br>Special Place Prelist |  |
|   | <b>Section D. IDENTIFICATION</b>     |                                |   |  |
|   | 1. ARA number _____                  |                                | 2. Block number _____                     |  |
| 3. Map spot number (Do not fill if ARA is 4001 — 5999.) _____   |                                      |                                |   |  |
| 4. Special place ID number _____  |                                      | 5. Sheet _____ of _____ sheets |   |  |

**ENUMERATOR NOTE** — All items **must be filled** for each group quarters listed.

| Section G. GROUP QUARTERS ASSOCIATED WITH SPECIAL PLACE |  |   |    |  |   | OFFICE USE ONLY   |
|---|--|---|----|--|---|-------------------|
| 1. Line No./GQ No.                                      | 2. ARA No.   | 3.  | 4. | 5. Block No.   | 6. Map spot number (Do not fill if ARA is 4001 — 5999.) |                   |
| 1 /   |  |   |    |  |   |                   |
| 7. House No.  | 8. Street name, or rural route (RR) and box No., or PO box No. |   |    |  | 9.  |                   |
| 10. Post Office   |  |   |    | 11. State  | 12. ZIP Code  |                   |
| 13a. Contact person                                     |  | b. Title or position                        |    | c. Telephone number<br>( )                                       |   |                   |
| 14. Road name (If no entry in 7)                        |  | 15. Location description (If no entry in 7) |    | 16a. County name (from map)                                      |   | b. Code           |
| 17a. Group Quarters name                                |  | b. Type of group quarters                   |    | c. Code <input type="checkbox"/> I<br><input type="checkbox"/> N |   | d. No. of persons |
| 2 /   |  |   |    |  |   |                   |
| 7. House No.  | 8. Street name, or rural route (RR) and box No., or PO box No. |   |    |  | 9.  |                   |
| 10. Post office   |  |   |    | 11. State  | 12. ZIP Code  |                   |
| 13a. Contact person                                     |  | b. Title or position                        |    | c. Telephone number<br>( )                                       |   |                   |
| 14. Road name (If no entry in 7)                        |  | 15. Location description (If no entry in 7) |    | 16a. County name (from map)                                      |   | b. Code           |
| 17a. Group Quarters name                                |  | b. Type of group quarters                   |    | c. Code <input type="checkbox"/> I<br><input type="checkbox"/> N |   | d. No. of persons |
| 3 /   |  |   |    |  |   |                   |
| 7. House No.  | 8. Street name, or rural route (RR) and box No., or PO box No. |   |    |  | 9.  |                   |
| 10. Post office   |  |   |    | 11. State  | 12. ZIP Code  |                   |
| 13a. Contact person                                     |  | b. Title or position                        |    | c. Telephone number<br>( )                                       |   |                   |
| 14. Road name (If no entry in 7)                        |  | 15. Location description (If no entry in 7) |    | 16a. County name (from map)                                      |   | b. Code           |
| 17a. Group Quarters name                                |  | b. Type of group quarters                   |    | c. Code <input type="checkbox"/> I<br><input type="checkbox"/> N |   | d. No. of persons |

Copy distribution: } After Special Place Prelist: **WHITE/YELLOW** — District Office  
 In District Office: **WHITE** — Attach to white D-351      **YELLOW** — Processing Office

D-351 (HU). Special Place Housing Units Address Sheet

OMB No. 0607-0621: Approval Expires 12/31/90

|   |   |   |
|---|---|---|
| <p><b>NOTICE</b> — Your report to the Census Bureau is <b>confidential</b> by law (title 13, U.S. Code). It may be seen only by sworn Census employees and may be used only for statistical purposes.</p> <p>FORM <b>D-351(HU)</b><br/>(7-22-88)</p> <p>U.S. DEPARTMENT OF COMMERCE<br/>BUREAU OF THE CENSUS</p> <p><b>SPECIAL PLACE HOUSING UNITS<br/>ADDRESS SHEET</b></p> <p><b>21st Decennial Census — 1990</b></p> | <p><b>A. District Office name</b> _____ <b>Code</b> _____</p> |   |
|   | <p><b>OFFICE USE ONLY</b></p>                                 |   |
|   | <p><b>B.</b> Page _____</p>                                   | <p><b>C. Source</b><br/>Special Place Prelist</p> |
|   | <p><b>Section D. IDENTIFICATION</b></p>                       |   |
|   | <p><b>1.</b> ARA number _____</p>                             | <p><b>2.</b> Block number _____</p>               |
| <p><b>3.</b> Map spot number (Do not fill if ARA is 4001—5999.) _____</p>   |   |   |
| <p><b>4.</b> Special place ID number _____</p>  | <p><b>5.</b> _____<br/>Sheet _____ of _____ sheets</p>        |   |

|   |  |   |                                  |   |   |                                   |  |
|---|--|---|----------------------------------|---|---|-----------------------------------|--|
| <p><b>ENUMERATOR NOTE</b> — All items <b>must be filled</b> for each housing unit listed.</p> |  |   |                                  |   |   | <p><b>OFFICE<br/>USE ONLY</b></p> |  |
| <p><b>Section H. HOUSING UNITS ASSOCIATED WITH SPECIAL PLACE</b></p>                          |  |   |                                  |   |   |                                   |  |
| <p><b>1.</b> Line No./HU No.<br/><b>1 /</b></p>   | <p><b>2.</b> ARA No. _____</p>   | <p><b>3.</b> _____</p>  | <p><b>4.</b> _____</p>           | <p><b>5.</b> Block No. _____</p>                | <p><b>6.</b> Map spot number (Do not fill if ARA is 4001—5999.) _____</p> | <p>Housing unit ID</p>            |  |
| <p><b>7.</b> House No. _____</p>  | <p><b>8.</b> Street name, or rural route (RR) and box No., or PO box No. _____</p> |   |                                  | <p><b>9.</b> Unit Desig. _____</p>              |   |                                   |  |
| <p><b>10.</b> Post Office _____</p>   |  | <p><b>11.</b> State _____</p>                                   | <p><b>12.</b> ZIP Code _____</p> | <p><b>13.</b> Occupant name _____</p>           |   |                                   |  |
| <p><b>14.</b> Road name (If no entry in 7) _____</p>  |  | <p><b>15.</b> Location description (If no entry in 7) _____</p> |                                  | <p><b>16a.</b> County name (from map) _____</p> | <p><b>b.</b> Code _____</p>   |                                   |  |
| <p><b>1.</b> Line No./HU No.<br/><b>2 /</b></p>   | <p><b>2.</b> ARA No. _____</p>   | <p><b>3.</b> _____</p>  | <p><b>4.</b> _____</p>           | <p><b>5.</b> Block No. _____</p>                | <p><b>6.</b> Map spot number (Do not fill if ARA is 4001—5999.) _____</p> | <p>Housing unit ID</p>            |  |
| <p><b>7.</b> House No. _____</p>  | <p><b>8.</b> Street name, or rural route (RR) and box No., or PO box No. _____</p> |   |                                  | <p><b>9.</b> Unit Desig. _____</p>              |   |                                   |  |
| <p><b>10.</b> Post Office _____</p>   |  | <p><b>11.</b> State _____</p>                                   | <p><b>12.</b> ZIP Code _____</p> | <p><b>13.</b> Occupant name _____</p>           |   |                                   |  |
| <p><b>14.</b> Road name (If no entry in 7) _____</p>  |  | <p><b>15.</b> Location description (If no entry in 7) _____</p> |                                  | <p><b>16a.</b> County name (from map) _____</p> | <p><b>b.</b> Code _____</p>   |                                   |  |
| <p><b>1.</b> Line No./HU No.<br/><b>3 /</b></p>   | <p><b>2.</b> ARA No. _____</p>   | <p><b>3.</b> _____</p>  | <p><b>4.</b> _____</p>           | <p><b>5.</b> Block No. _____</p>                | <p><b>6.</b> Map spot number (Do not fill if ARA is 4001—5999.) _____</p> | <p>Housing unit ID</p>            |  |
| <p><b>7.</b> House No. _____</p>  | <p><b>8.</b> Street name, or rural route (RR) and box No., or PO box No. _____</p> |   |                                  | <p><b>9.</b> Unit Desig. _____</p>              |   |                                   |  |
| <p><b>10.</b> Post Office _____</p>   |  | <p><b>11.</b> State _____</p>                                   | <p><b>12.</b> ZIP Code _____</p> | <p><b>13.</b> Occupant name _____</p>           |   |                                   |  |
| <p><b>14.</b> Road name (If no entry in 7) _____</p>  |  | <p><b>15.</b> Location description (If no entry in 7) _____</p> |                                  | <p><b>16a.</b> County name (from map) _____</p> | <p><b>b.</b> Code _____</p>   |                                   |  |
| <p><b>1.</b> Line No./HU No.<br/><b>4 /</b></p>   | <p><b>2.</b> ARA No. _____</p>   | <p><b>3.</b> _____</p>  | <p><b>4.</b> _____</p>           | <p><b>5.</b> Block No. _____</p>                | <p><b>6.</b> Map spot number (Do not fill if ARA is 4001—5999.) _____</p> | <p>Housing unit ID</p>            |  |
| <p><b>7.</b> House No. _____</p>  | <p><b>8.</b> Street name, or rural route (RR) and box No., or PO box No. _____</p> |   |                                  | <p><b>9.</b> Unit Desig. _____</p>              |   |                                   |  |
| <p><b>10.</b> Post Office _____</p>   |  | <p><b>11.</b> State _____</p>                                   | <p><b>12.</b> ZIP Code _____</p> | <p><b>13.</b> Occupant name _____</p>           |   |                                   |  |
| <p><b>14.</b> Road name (If no entry in 7) _____</p>  |  | <p><b>15.</b> Location description (If no entry in 7) _____</p> |                                  | <p><b>16a.</b> County name (from map) _____</p> | <p><b>b.</b> Code _____</p>   |                                   |  |

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D-376. Refusal Record

FORM D-376  
(8-7-87)

U.S. DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS

## REFUSAL RECORD

### 21st Decennial Census — 1990

|  |               |  |               |
|--|---------------|--|---------------|
| <b>1. REFUSAL IDENTIFICATION</b>   |               | <b>2. REFUSAL TYPE</b>   |               |
| a. ID number   |               | <input type="checkbox"/> Total<br><br><input type="checkbox"/> Partial — Less than last resort obtained  |               |
| b. Occupant name   |               |  |               |
| c. Mailing address   |               |  |               |
| d. Location description — <i>If necessary</i>  |               | <b>3. FORM TYPE</b>  |               |
| e. Telephone number — <i>Include area code</i>   |               | <input type="checkbox"/> Questionnaire — Long<br><input type="checkbox"/> Questionnaire — Short<br><input type="checkbox"/> ICR — Long<br><input type="checkbox"/> ICR — Short |               |
| <b>4. PERSON'S REASON(S) FOR REFUSING</b>  |               |  |               |
|  |               |  |               |
| <b>5. ENUMERATOR IDENTIFICATION</b>  |               |  |               |
| a. Name  | b. CLD number | c. DO code   | d. ARA number |
| e. Signature   |               |  | Date          |
| <b>6. CREW LEADER ACTION</b>   |               | <b>7. FIELD OPERATIONS SUPERVISOR ACTION</b>   |               |
| a. <input type="checkbox"/> Refusal converted<br><input type="checkbox"/> Refusal verified — No further information obtained |               | a. <input type="checkbox"/> Refusal converted<br><input type="checkbox"/> Refusal verified — No further information obtained   |               |
| b. Signature   | Date          | b. Signature   | Date          |
| c. Date submitted to Field Operations Supervisor   |               | c. Date submitted to Assignment Control  |               |
| <b>NOTES</b>   |               |  |               |
|  |               |  |               |

Copy distribution: **WHITE** — Enumerator    **YELLOW** — Crew Leader    **PINK** — Field Operations Supervisor    **GOLDENROD** — Assignment Control



D-377. Deletion Record

|  |   |  |            |                |              |  |  |  |  |
|--|---|--|------------|----------------|--------------|--|--|--|--|
| FORM <b>D-377</b><br>(1-19-89)                                     | U.S. DEPARTMENT OF COMMERCE<br>BUREAU OF THE CENSUS                               |  | 1. DO code | 2. ARA No.     | 3. Block No. | 4. Map spot No.  |  |  |  |
|  | <b>DELETION RECORD</b><br><b>21st Decennial Census — 1990</b>                     |  |            | 5. Unit ID No. |              | 6. Deletion reason<br>Enter 2-digit code from below. <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table> |  |  |  |
|  |   |  |            |                |              |  |  |  |  |
|  | 7. Deleted address  |  |            |                |              |  |  |  |  |
| a. House No. and street name, or rural route and box No. or PO box |   |  |            |                |              |  |  |  |  |
| <b>INSTRUCTIONS</b>  | • Do not delete listings for housing units that are <b>within</b> special places. |  |            |                |              |  |  |  |  |
|  | • Complete and turn in a deletion record on the day you discover each delete.     |  |            |                |              |  |  |  |  |
|  |   |  | b. City    | c. State       | d. ZIP Code  |  |  |  |  |

**DELETION CODES/REASONS**

*Use the following codes/reasons to describe the deleted unit.*

| CODE | REASON                         |
|------|--------------------------------|
| 01   | Business or commercial address |
| 02   | Entire special place           |
| 03   | Demolished                     |
| 04   | No such address                |
| 05   | Duplicate of another listing   |
| 06   | Vacant — Open to the elements  |
| 07   | Under construction             |
| 08   | Condemned                      |

|                       |  |            |
|-----------------------|--|------------|
| 8.<br><br>ENUMERATOR  | I certify that this information is true and correct and have completed the work in accordance with instructions. |            |
|                       | a. Name — <i>First name, middle initial, last name</i>   |            |
|                       | b. Signature   | Date       |
| 9.<br><br>CREW LEADER | I certify that I have reviewed the information and that the work has been completed satisfactorily.              |            |
|                       | a. Name — <i>First name, middle initial, last name</i>   | b. CLD No. |
|                       | c. Signature   | Date       |



SF-256. Self-Identification of Handicap

**SELF-IDENTIFICATION OF HANDICAP**

(See instructions and Privacy Act information on reverse)

|                                       |                      |                        |                          |
|---------------------------------------|----------------------|------------------------|--------------------------|
| Last Name, First Name, Middle Initial | Birth Date (Mo./Yr.) | Social Security Number | <b>ENTER CODE HERE</b> → |
|---------------------------------------|----------------------|------------------------|--------------------------|

**DEFINITION OF A HANDICAP:** A person is handicapped if he or she has a physical or mental impairment which substantially limits one or more major life activities; has a record of such impairment; or is regarded as having such impairment. Those handicaps that

are to be reported are listed below (codes in bold numbers 13 through 94). In the case of multiple impairments, choose the code which describes the impairment that would result in the most substantial limitation.

**TO THE EMPLOYEE:** Self-identification of handicap status is essential for effective data collection and analysis. The information you provide will be used for statistical purposes only and will not in any way affect you individually. While self-identification is voluntary, your cooperation in providing accurate information is critical.

**01** I do not wish to identify my handicap status. (Please read the employee note above and the reverse side of this form before using this code.) (Note: Your personnel officer may use this code if, in his or her judgment, you used an incorrect code.)

**05** I do not have a handicap.

**06** I have a handicap but it is not listed below.

**SPEECH IMPAIRMENTS**

**13** Severe speech malfunction or inability to speak; hearing is normal (Examples: defects of articulation [unclear language sounds]; stuttering; aphasia [impaired language function]; laryngectomy [removal of the "voice box"])

**HEARING IMPAIRMENTS**

**15** Hard of hearing (Total deafness in one ear or inability to hear ordinary conversation, correctable with a hearing aid)

**16** Total deafness in both ears, with understandable speech

**17** Total deafness in both ears, and unable to speak clearly

**VISION IMPAIRMENTS**

**22** Ability to read ordinary size print with glasses, but with loss of peripheral (side) vision (Restriction of the visual field to the extent that mobility is affected—"Tunnel vision")

**23** Inability to read ordinary size print, not correctable by glasses (Can read oversized print or use assisting devices such as glass or projector modifier)

**24** Blind in one eye

**25** Blind in both eyes (No usable vision, but may have some light perception)

**MISSING EXTREMITIES**

**27** One hand

**28** One arm

**29** One foot

**32** One leg

**33** Both hands or arms

**34** Both feet or legs

**35** One hand or arm and one foot or leg

**36** One hand or arm and both feet or legs

**37** Both hands or arms and one foot or leg

**38** Both hands or arms and both feet or legs

**NONPARALYTIC ORTHOPEDIC IMPAIRMENTS**

(Because of chronic pain, stiffness, or weakness in bones or joints, there is some loss of ability to move or use a part or parts of the body.)

**44** One or both hands

**47** One or both legs

**45** One or both feet

**48** Hip or pelvis

**46** One or both arms

**49** Back

**57** Any combination of two or more parts of the body

**PARTIAL PARALYSIS**

(Because of a brain, nerve, or muscle problem, including palsy and cerebral palsy, there is some loss of ability to move or use a part of the body, including legs, arms, and/or trunk.)

**61** One hand

**67** One side of body, including one arm and one leg

**62** One arm, any part

**63** One leg, any part

**64** Both hands

**68** Three or more major parts of the body (arms and legs)

**65** Both legs, any part

**66** Both arms, any part

**COMPLETE PARALYSIS**

(Because of a brain, nerve, or muscle problem, including palsy and cerebral palsy, there is a complete loss of ability to move or use a part of the body, including legs, arms, and/or trunk.)

**70** One hand

**76** Lower half of body, including legs

**71** Both hands

**77** One side of body, including one arm and one leg

**72** One arm

**73** Both arms

**74** One leg

**78** Three or more major parts of the body (arms and legs)

**75** Both legs

**OTHER IMPAIRMENTS**

**80** Heart disease with no restriction or limitation of activity (History of heart problems with complete recovery)

**81** Heart disease with restriction or limitation of activity

**82** Convulsive disorder (e.g., epilepsy)

**83** Blood diseases (e.g., sickle cell anemia, leukemia, hemophilia)

**84** Diabetes

**86** Pulmonary or respiratory disorders (e.g., tuberculosis, emphysema, asthma)

**87** Kidney dysfunctioning (e.g., if dialysis [Use of an artificial kidney machine] is required)

**88** Cancer—a history of cancer with complete recovery

**89** Cancer—undergoing surgical and/or medical treatment

**90** Mental retardation (A chronic and lifelong condition involving a limited ability to learn, to be educated, and to be trained for useful productive employment as certified by a State Vocational Rehabilitation agency under section 213.3102(t) of Schedule A)

**91** Mental or emotional illness (A history of treatment for mental or emotional problems)

**92** Severe distortion of limbs and/or spine (e.g., dwarfism, kyphosis [severe distortion of back])

**93** Disfigurement of face, hands, or feet (e.g., distortion of features on skin, such as those caused by burns, gunshot injuries, and birth defects [gross facial birthmarks, club feet, etc.])

**94** Learning disability (A disorder in one or more of the processes involved in understanding, perceiving, or using language or concepts [spoken or written]; e.g., dyslexia)

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## Chapter 7. Processing Offices— Establishment and Organization

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# SELECTED ABBREVIATIONS AND ACRONYMS USED IN CENSUS OPERATIONS

|        |  |      |  |
|--------|--|------|--|
| ABPO   | Albany (New York) processing office                | GEO  | Geography Division                         |
| AF     | applicant file                                     | GSA  | General Services Administration            |
| AMA    | Assistant Manager for Administration               | HQ   | headquarters                               |
| ARS    | automated recordkeeping system                     | ICR  | individual census report                   |
| AUPO   | Austin (Texas) processing office                   | ID   | identification (number)                    |
| ADP    | automated data processing                          | JFPO | Jeffersonville (Indiana) processing office |
| APSD   | Administrative and Publications Services Division  | JXPO | Jacksonville (Florida) processing office   |
| BAPO   | Baltimore (Maryland) processing office             | KCPO | Kansas City (Missouri) processing office   |
| BTS    | bin tracking system                                | MA   | metropolitan area                          |
| CATS   | control and tracking system                        | MAD  | microfilm access device                    |
| CCF    | collection control file                            | MIS  | management information system              |
| CCWG   | census closeout working group                      | NFC  | National Finance Center                    |
| CU     | camera unit  | NSC  | National Support Center                    |
| DCS    | data control system                                | PCU  | procedures control unit                    |
| DO     | district office                                    | PES  | post-enumeration survey                    |
| DOD    | Decennial Operations Division                      | PO   | processing office                          |
| DPD    | Data Preparation Division                          | POCS | processing office coordination staff       |
| DSSD   | Decennial Statistical Studies Division             | POM  | processing office manager                  |
| EEO    | equal employment opportunity                       | PRO  | procurement office                         |
| FACT   | film automated camera technology                   | RCC  | regional census center                     |
| FOSDIC | film optical sensing device for input to computers | RO   | regional office                            |
| FLD    | Field Division                                     | SDPO | San Diego (California) processing office   |
|        |  | TSD  | Technical Services Division                |
|        |  | WMU  | workflow management unit                   |

# CHAPTER 7.

## Processing Offices—Establishment and Organization

### INTRODUCTION

A major strategy for the 1990 census was the implementation of “flow” (concurrent) processing, the conversion of census questionnaire data on an individual form-flow basis so that they could be edited and corrected concurrently with field operations. For the 1980 census, data capture did not occur until a field office closed and shipped its questionnaires to the processing offices.

To provide for concurrent processing, data conversion was decentralized beyond the three processing sites used in 1980. For 1990, seven processing offices (PO’s) converted entries on completed questionnaires into machine-readable form and controlled other aspects of the census. These offices were located in the cities of Albany, NY; Austin, TX; Baltimore, MD; Jacksonville, FL; Jeffersonville, IN; Kansas City, MO; and San Diego, CA.

This chapter describes PO site selection, equipment installation, organization, staffing, recruitment, training, and closing activities. Chapter 8, “Pretabulation Processing,” covers the PO processing flow from questionnaire receipt to library storage.

### ORGANIZATIONAL STRUCTURE

The management of the processing offices started at Bureau headquarters (HQ) and progressed through the hierarchy of the PO itself. The following flow-charts outline PO organizational structure down to the first level of supervision. (See figures 1-4, pages 4-7.)

The top four positions in each PO, other permanent Census Bureau personnel, and temporary employees were filled by staff from the Decennial Operations Division (DOD), while local applicants were hired for the remaining positions. The processing office manager (POM) had overall responsibility for carrying out HQ plans and directives and for accomplishing the PO’s mission, which included planning, initiating, and controlling all activities of the office. This person reported to the Assistant Division Chief for PO’s within the DOD. The POM was assisted by three assistant managers, whose responsibilities were in the areas of administration, processing operations, and automated data processing (ADP), respectively. These assistant managers were expected to plan, control, and evaluate the effectiveness of all clerical and automated processes directly related to the processing of census data. The positions also involved planning, managing, and controlling the information systems in the PO’s workflow through all processing stages, and regular reporting on the progress of the work.

The PO’s were divided into three main areas corresponding to the responsibilities of the above-mentioned assistant managers. The processing operations area was responsible for all clerical operations, activities, programs, and functions associated with 1990 census processing. Most of these activities involved correcting questionnaires or addresses (see p. 5). The ADP operations area was responsible for all ADP activities, programs, functions, and equipment. This area’s primary function was to convert the written responses on paper questionnaires into computer-readable format, through either manual data entry or the film automated camera technology (FACT 90) system (see p. 7). Similarly, the administrative operations area handled all personnel, payroll, and administrative services activities and functions (see p. 6). Below the operations level, the PO organizational hierarchy consisted of (in descending order) branches, sections, and units. For example, the processing operations area included the General Operations Branch and the Information Systems Management Branch; the sections within the Information Systems Management Branch consisted of the Processing Coordination Section, the Quality Assurance Section, the Training Section, and the Post Office Liaison; and the Processing Coordination Section was composed of the Workflow Management Unit and the Procedure Control Unit (see p. 5).

### ESTABLISHING THE PROCESSING OFFICES

The DOD determined the physical size of the PO’s depending on the estimated workload/production rate; the type and quantity of electronic data processing, cameras and other special purpose equipment to be used; storage, shipping, and receiving space requirements; and the anticipated number of employees. The PO’s ranged in size from 105,000 to 130,000 square feet, much smaller than the size of the average 1980 PO—which contained approximately 320,000 square feet. The seven PO’s required a total of approximately 865,000 square feet. The annual cost of this space was \$14,151,304. In addition, seven warehouse sites, containing 671,957 square feet, were leased at an annual cost of around \$1.9 million.

The Bureau began the process of selecting PO sites within the Nation’s metropolitan areas (MA’s) by using the following initial criteria:

- The areas must have labor pools that meet census recruitment requirements.
- The economic conditions of the area (mainly unemployment rates and salary levels) should enable the Bureau to appeal to the labor force.

Figure 1. Administrative Operations Substructure

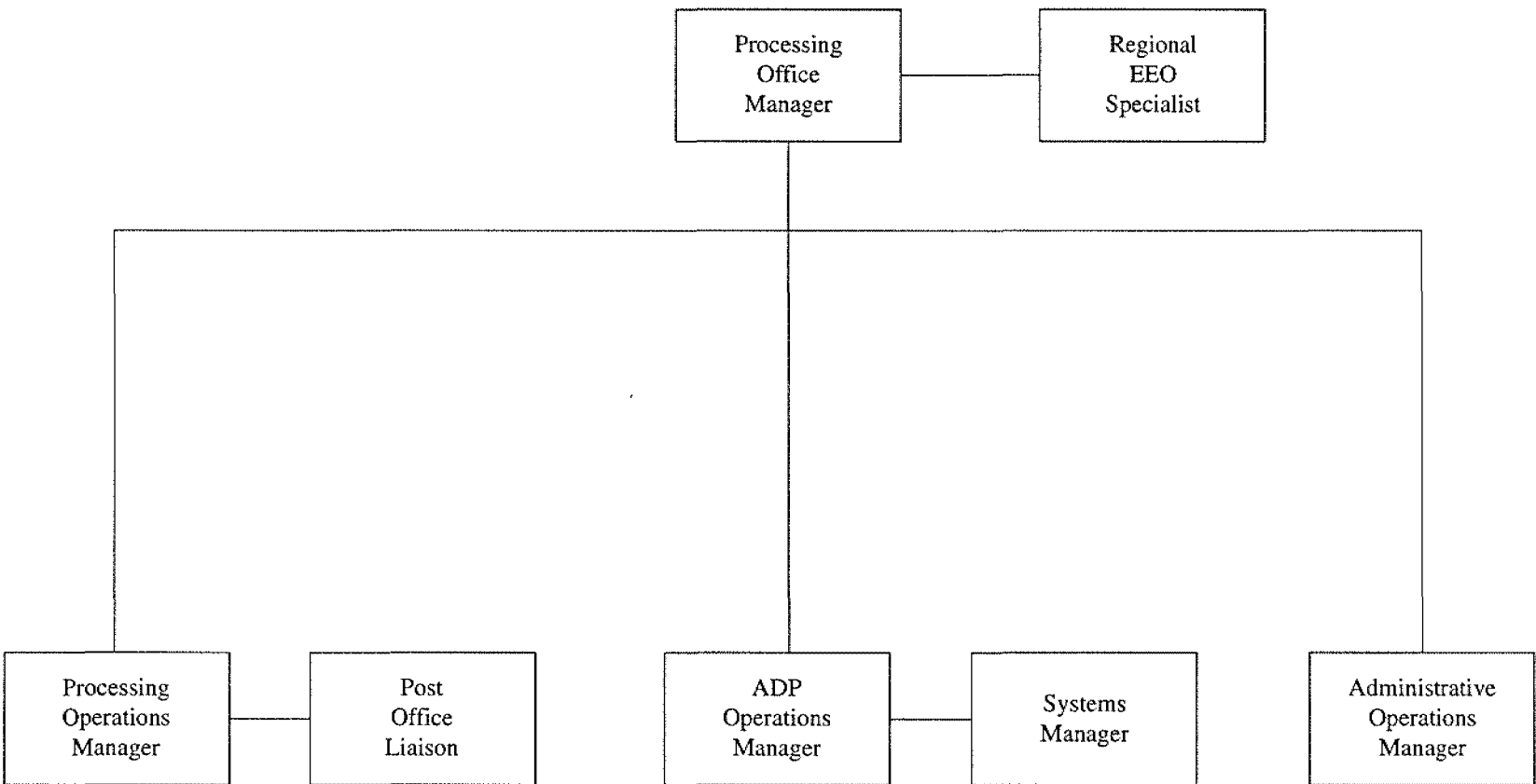




Figure 2. Processing Operations Substructure

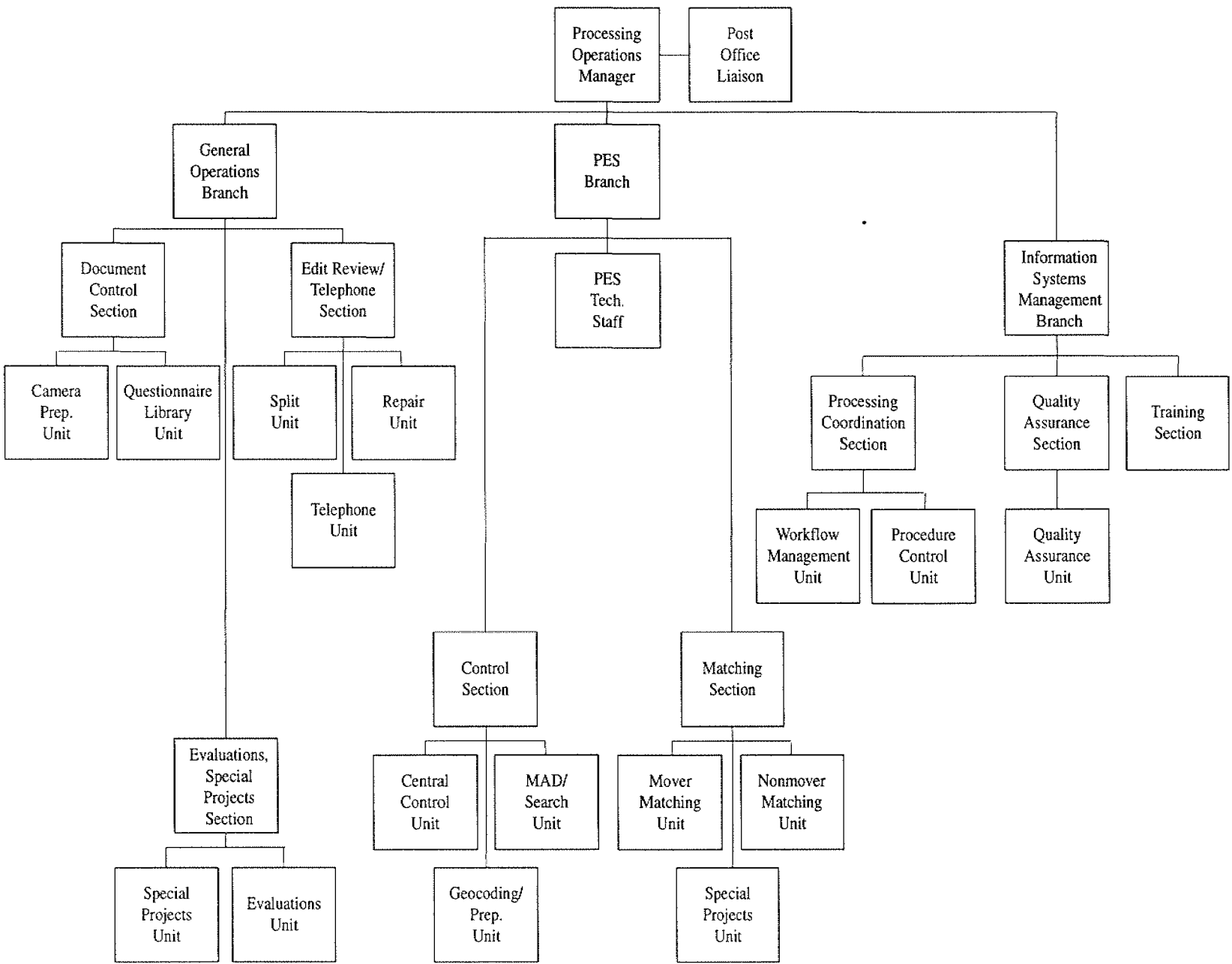
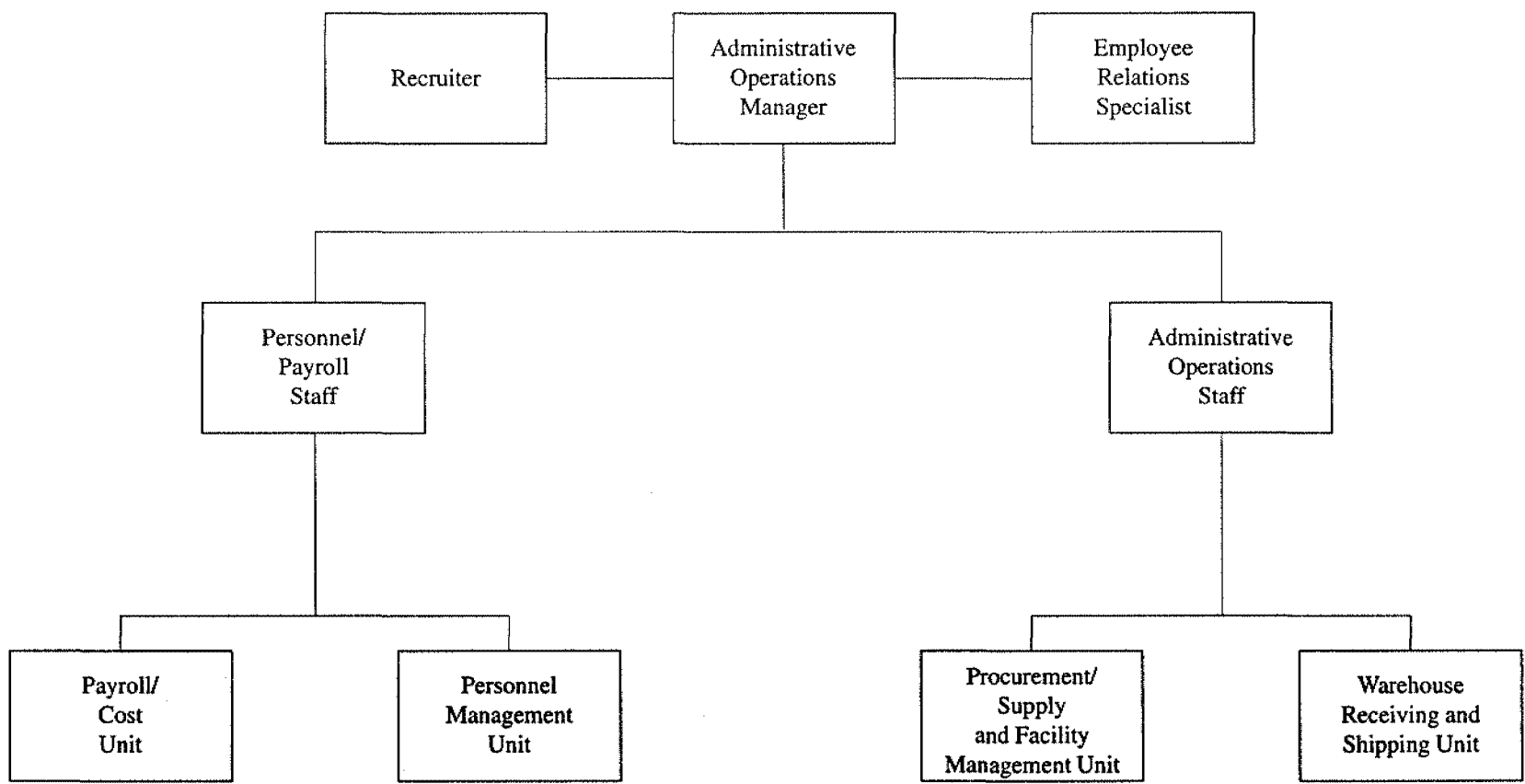


Figure 3. Administrative Operations Substructure



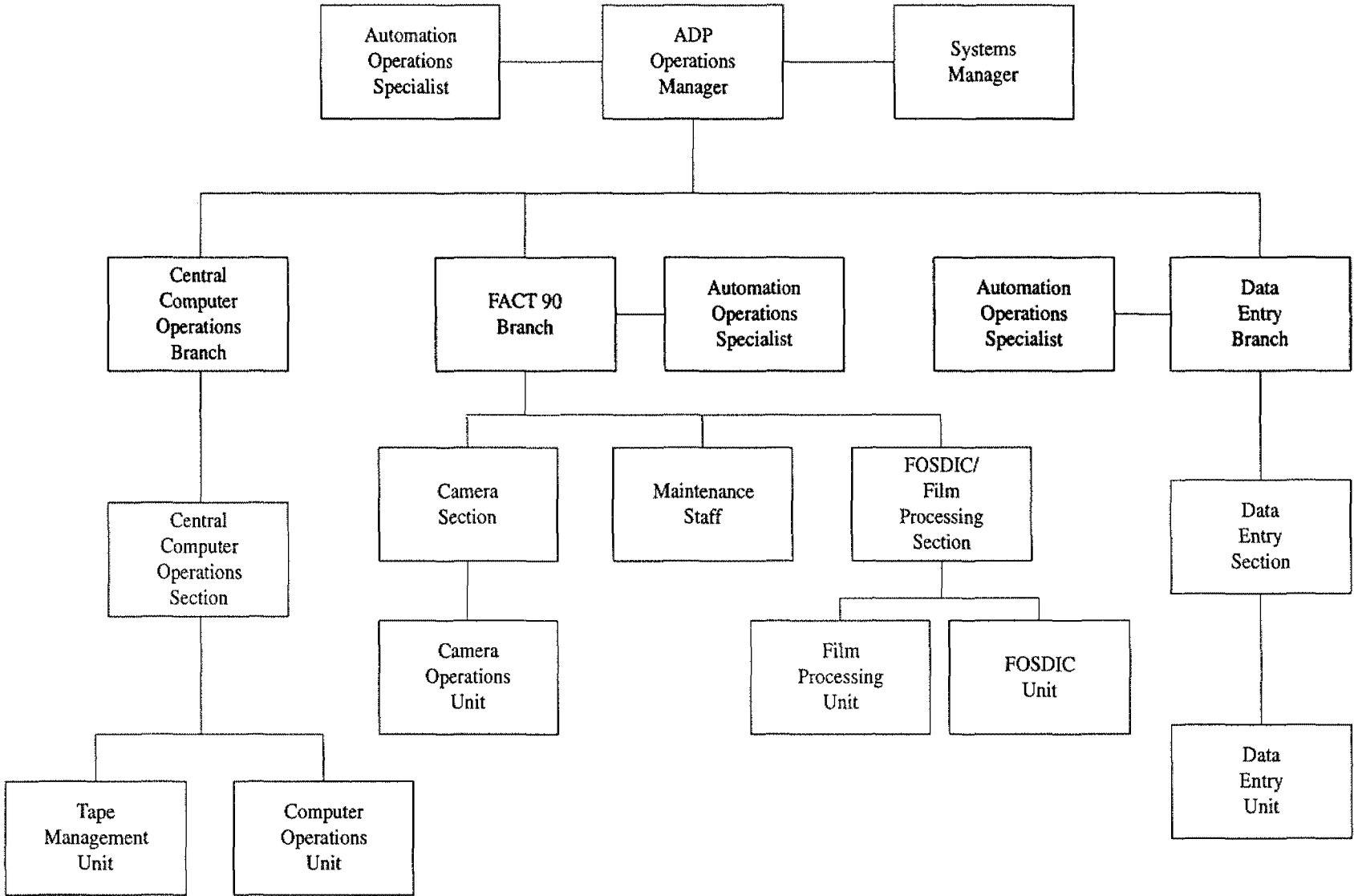


Figure 4. ADP Operations Substructure

- The locations must be geographically accessible by major highways and air transportation.
- The locations must not conflict with other census offices such as the 12 Regional Offices (RO's) and the 13 Regional Census Centers (RCC's).

The MA was the basic geographic area of consideration because it had a large population base that could support the staffing requirements of a PO, and sufficient comparable data were available to permit meaningful analysis. All MA's were considered for selection and were stratified within each PO area based on ranking factors determined by applying values ("0" for unacceptable to "4" for excellent) in response to three questions:

1. Does the MA have a labor pool from which to hire a peak staff of approximately 1,500 persons?
2. Does the available labor pool have the education and skills necessary to perform PO operations?
3. Are the Bureau's wages competitive so that the PO can attract appropriately skilled individuals from the labor pool?

Independent evaluation criteria were developed for each of the classifications.

Approximately five MA's in each PO region were selected from this evaluation. The Field Division was allowed to request that an MA be eliminated from consideration if attempts to hire both Field and PO personnel from the same labor pool might result in labor shortages, wage increases, or both. For the first four PO's selected, the Field Division requested that five MA's be eliminated from further consideration because of anticipated hiring competition. The DOD granted these requests.

The DOD selected one or more of the remaining MA's in each PO region for space identification and evaluation, depending on the amount of time remaining before the PO had to open. The Bureau had received authority from the General Services Administration (GSA) to lease and renovate the PO's. The Administrative and Publications Services Division's (APSD) real property contracting officers negotiated and signed the leases for six of the seven PO's. The Jeffersonville PO required only additional warehouse space, which was leased by the APSD's warrant contracting officers.

After analysis, the Bureau decided on the following seven locations, listed by scheduled opening date:

| PO location & acronym     | Opening dates |               |
|---------------------------|---------------|---------------|
|                           | Scheduled     | Actual        |
| Kansas City, MO (KCPO)    | January 1988  | February 1988 |
| Baltimore, MD (BAPO)      | February 1988 | February 1988 |
| Jacksonville, FL (JXPO)   | November 1988 | January 1989  |
| San Diego, CA (SDPO)      | February 1989 | February 1989 |
| Albany, NY (ABPO)         | August 1989   | October 1989  |
| Austin, TX (AUPO)         | August 1989   | August 1989   |
| Jeffersonville, IN (JFPO) | October 1989  | October 1989  |

## Opening the Processing Offices

The Kansas City PO opened first to process the 1988 dress rehearsal materials. Then the Baltimore PO opened to assist in the prelist processing workload (see ch. 6). The Jacksonville and San Diego PO's opened next to help in processing the precensus materials. While these PO's opened well before the census and took part in a variety of precensus activities (see chs. 4 and 6), their principal responsibility was to process census questionnaires and other materials and convert the data from paper to computer format for processing and tabulation (see ch. 8).

The DOD developed the PO floor plan and architectural design in cooperation with the APSD and an independent architectural and engineering firm contracted by the APSD. The major considerations in the design phase included but were not limited to the following:

- Floor plan/building layout to accommodate the flow of work required
- Special-purpose areas to accommodate training and data-entry requirements
- Electrical power requirements for special-purpose equipment
- Air conditioning requirements for special-purpose equipment areas
- Electronic fire and security alarm systems
- Loading dock, receiving section, and elevators
- Rest and break room facilities to accommodate staffing levels

The extent of the renovations varied from one PO to another depending on the type of office space leased.

About 5 months before the scheduled opening of the PO, the processing office manager (POM) moved to the PO city to work closely with the building owners or their representatives during the buildout<sup>1</sup> phase. APSD personnel made inspection trips to make sure the necessary work proceeded in accordance with the final approved design.

Within 30 days after a contract award, the lessor was required to provide a final work schedule including timing for design completion and other construction milestones. In addition, the lessor submitted written progress reports and/or held meetings every 7 days to detail the work completed by phase, expected date of completion, changes to work, material shortages, and any other modifications. The POM submitted a weekly report detailing the construction progress and the weekly percentage of work required to complete the buildout by the scheduled completion date.

<sup>1</sup>This was the construction and preparation of the PO building in accordance with the Census Bureau's specifications.

Some of the PO's experienced a high incidence of power interruptions. Uninterruptible power systems were designed and installed at the Jeffersonville and Austin PO's, although the Jeffersonville facility continued to experience sporadic outages.

**Buildout of special-purpose areas**—In addition to the overall buildout of the PO's, specialized areas (such as the microfilm development area) had to be constructed in each of the seven PO's. The technical specifications had to be very detailed because the lessors used them to prepare bids and build the work areas. The APSD had to estimate the amount of electrical power each PO would need based upon the quantity and type of equipment planned for each office. Most of these installations went smoothly, although the Bureau encountered occasional difficulties in complying with local regulations and sewage system requirements and capacities.

In early 1989, the Bureau began negotiating with the city of Albany, NY, to obtain permission to discharge microfilm processor effluent into its sewer system. The Albany PO was to be located in a low-density area that did not have the facilities to dispose of this effluent in an environmentally sound manner. The Bureau therefore decided not to discharge the effluent through the PO's waste disposal system and leased a nearby site for which the city of Albany had approved a sewer connection to its system. Microfilm processing was planned for this newly acquired off-site location. During this time, negotiations were also in progress with the general contractor, who was responsible for domestic waste disposal via the expansion of the existing in-ground filtration system or the construction of a 2-mile pipe extension to the Albany city sewer system. The lessor decided against the extended hookup and opted for expanding the existing in-ground filtration system. The completion of the floor plan and design of the PO was delayed while these negotiations took place.

In addition to the sewage problems, Bureau officials had to work with the lessor and local city sewage officials to determine the cause of an insufficient water supply into the Albany off-site microfilm processing unit. This was rectified and microfilm processing took place on schedule. The August-to-October 1989 delay in occupying the ABPO had no significant impact on the installation of equipment or the processing of census data.

The DOD hired electronic technicians for on-site maintenance of the microfilm cameras, film processors, laser sorters, and FOSDIC (film optical sensing device for input to computers) equipment. For each PO, six technicians went through a 6-week crash course in the electronics germane to census equipment. Technical Services Division (TSD) personnel taught the courses. In addition, the contractor for the microfilm processor systems provided emergency service in the PO's. A TSD diagnostic expert was present during the data-capture period to evaluate hardware/software performance and to provide consultation on complex maintenance and repair problems.

**Installation and testing of ADP equipment**—The TSD, along with the Automated Data Processing, Acquisition, and Telecommunications Staffs, was responsible for the procurement of the ADP and other special-purpose equipment used in the PO's. The DOD prepared the statements of work for many contracts, such as an ADP hardware contract awarded in September 1986 and a software support contract, awarded in September 1987. Other contracts included those for bar-code wands and microfilm access devices (MADS), which were used to read and print hard copy of FOSDIC film.

## LOGISTICS

### Supplies

The DOD determined the furniture, services, and administrative supply and equipment needs for the PO's. As the PO's began to open, each received an initial shipment of forms, supplies, equipment, and furniture. They also were resupplied with additional items throughout their existence. To streamline the procedure for ordering supplies for the PO's, the DOD Acquisition Staff provided a master inventory of supply items called the "1990 Decennial Processing Office Supply Catalog." The catalog was used for the initial acquisition and resupply of equipment, supplies, and forms and provided a simplified and timely method of ordering initial and resupply items. Materials listed in the catalog were warehoused by and disbursed from the Data Preparation Division (DPD) in Jeffersonville, IN.

Small-purchase authority was delegated to each PO via three "blanket purchase agreements" issued to two separate companies for office supplies, duplication services, and ADP supplies. Other small-purchase requirements (not available through the resupply system or bank-card authority) were processed by the Procurement Office (PRO) or the DPD procurement group. All contracts for materials and services were approved by the acquisition staff of the DOD and processed by the PRO. The Acquisition Staff also used credit cards to make emergency purchases for necessary supplies.

The DOD's Acquisition Staff, assisted by the DPD's Support Services Staff, Supply Management element, had surplus office furniture and start-up supplies delivered to each PO for use during the buildout. Some of the items provided by this staff were:

| Item                                      | Quantity      |
|---|---------------|
| Workstations                              | 1,808         |
| Typewriters                               | 180           |
| Steel shelving<br>(general/questionnaire) | 3,384 (units) |
| Bond paper (8 1/2 x 14)                   | 3,583 (boxes) |

Such items were used for employee workstations, administrative offices, and storing processing materials and questionnaires in the libraries (see ch. 8). Approximately \$6.8 million of stock was purchased for the PO's. There were more than 3,400 supply shipments to the PO's, at a cost of over \$370,000. Each PO ADP, administrative, and procurement manager had a bank card, the limitations and use of which were stipulated in the 1990 Processing Office Administrative Manual.

## Staffing

In addition to working on the buildout, the POM contacted local agencies for recruiting purposes. During peak operations, the PO's needed to recruit and test over 42,000 job applicants nationwide for temporary positions within the seven PO's. The Bureau planned to recruit four applicants for every authorized position. The PO staffs were selected from the local labor force and were to have a race-ethnic mix comparable to that of the surrounding population; hence Equal Employment Opportunity (EEO) plans had to be developed for each site. The PO prepared a periodic report comparing the race and sex of the office's work force to the local labor force. These reports contained statistical data only and did not reveal any information about specific individuals.

**Recruitment**—The PO's used every reasonable method of attracting applicants. Each PO determined which particular recruiting sources, strategies, and techniques to use after analyzing its geographic area. To secure job applicants, the assistant manager for administration (AMA) and the PO recruiter contacted sources such as State employment agencies, community groups, and various civic organizations. Census recruiters also used the news media, press releases, brochures, and open houses to attract candidates from the general public. The DOD and the FLD pursued a joint recruiting program for the 1990 census in which the RCC's coordinated the necessary media advertisements and organizational contacts. All recruiting efforts ensured that census employment was consistent with EEO principles. Each PO maintained a computer data base, called an applicant file (AF), that contained employment data for qualified job applicants and employees. (See chapter 6 for more details.)

The principal means of selection for hiring was a written test (Field Employee Selection Aid Test—General) administered to applicants, along with specific qualifications based on a review of the applicant's Standard Form 171 application. Those who completed the selection aid test and expressed an interest in data-entry clerk positions also took an automated typing test. Final selections for hiring at the supervisory level were made by PO management. The personnel office at each processing site selected the clerical staff. All applicable OPM rules and regulations for hiring were followed.

Recruiting, testing, and hiring began before the offices opened in 1988/89, and continued through much of their existence. Between 500 and 600 clerical employees were needed for each office's processing operations area, plus 500 to 600 people for the data processing area to handle data input, keying, and various other computer operations. In addition, the administrative area hired between 100 and 200 workers to process payroll, personnel, travel, and supplies and to perform services such as procurement, warehousing, shipping, and other related duties. One direct supervisor was hired for about every 20 employees. With peak operations requiring 3 shifts per day for 6-7 days per week, each PO hired between 1,400 and 1,500 people. Overall, recruiting was successful, but some PO's, such as the Albany PO (ABPO), had difficulty hiring full-time personnel. The DOD continued extensive recruiting efforts in an attempt to assist the ABPO in reaching its authorized employment level, and the ABPO succeeded in meeting this goal after altering its shift-recruitment strategy to allow for part-time employees.

Each branch in the PO was divided into units of clerks who specialized in one of several stages in census processing. Large units (more than 30 clerks) were divided into subunits headed by a supervisory clerk who assisted in overseeing day-to-day operations and monitored production, the quality of production, and the morale of the clerks. Assignment clerks kept records of each subunit.

The unit chief (also known as the clerical supervisor) was in charge of the unit's production. A control clerk used the bin tracking system (BTS) and the control and tracking system (CATS) to monitor the flow of materials in and out of the unit.

For each unit, staffing levels were determined by the size of the workload, the work involved, and the duration of the operation. The PO coordination staff (POCS) at Bureau headquarters established these levels for census processing.

## Training

The DOD prepared procedural manuals and training packages for all administrative and processing operations. Training for all PO operations moved on parallel tracks at each of the seven sites (except the KCPO, which did not process any type 1 mail or enumerator returns). Census requirements demanded that each employee be trained using a program that taught the same procedures in the same way, in every session, at each location, in an extremely short time span. Since highly complex and sophisticated procedures were used, training techniques that simplified the instruction process were essential. Training was an ongoing effort because of the large number of employees that needed to be prepared to staff multiple shifts for some operations, to meet additional workloads, and to replace those who were promoted or resigned, as well as to retrain staff on revised procedures.

The Bureau conducted two types of classroom training: The lecture-practice method incorporated a brief lecture about the requirements of each job, followed by practice exercises that were designed to reinforce learning. The “see and do” approach allowed trainees to watch a video of their actual job in progress before they performed the job under the guidance of the unit supervisor. This approach replaced the self-study approach used in previous censuses and was designed to provide efficient retraining of less skilled employees and handy training for replacements. The DOD’s training package standards ensured that all training modules and packages were uniform. The purpose was to facilitate the trainers’ ability to deliver training on a variety of operations within a 5-week period.

For each approach, a trainer’s guide provided an outline or verbatim (scripted) guide to ensure uniformity in training across all PO’s. Trainees were given a workbook that described key steps in the job and provided practice exercises. Both the trainer’s guide and the trainee workbook were based on a procedures manual for each job. Employees were expected to be thoroughly familiar with the manual and were encouraged to use it as a reference as needed.

Each PO had a training staff that consisted of three to six trainers and a section chief. The trainers did the clerical training but were assisted by unit chiefs due to the large workload during startup.

The administrative operations supervisors and specialists conducted a 5-hour orientation for all new employees. New hires usually attended this orientation a week before their scheduled operational training. The orientation included the presentation of the 1990 census overview, 1990 quality assurance (QA), and administrative procedures videos, in addition to a general discussion about the PO and its administration. New hires were given time to complete numerous government and administrative forms.

**Management training**—There were two levels of 5-day management training supplemented by 2 days of administrative training. Prior to the PO opening, the PO manager and assistant managers attended an overview of procedures training at an off-site conference facility. The branch and section chiefs’ training took place at the PO. Generic management topics included problem solving, communication, performance monitoring, EEO issues, and alcohol and drug abuse issues. Both levels of trainees received training on pertinent administrative and procedural topics such as personnel, payroll, specific automated equipment, quality assurance, and operational workflow.

**Supervisory training**—Unit chiefs received a 4-day supervisory skill workshop conducted by a team of trainers composed of HQ staff, PO trainers, and outside consultants. The training included an overview of the decennial census process, building confidence and motivating employees, effective communication, situational leadership, developing teamwork, and managing a culturally diverse workforce. In addition to this workshop, they received training in

their area of responsibility by attending and conducting “dry-runs” (operations either simulated or using practice materials), or by simply reading the procedures. All these people received quality assurance training because their jobs included analyzing production and QA reports. QA clerks recommended ways to improve production and quality, and supervisory clerks responded to these recommendations.

The QA clerks and supervisory clerks were cross-trained through role playing, lectures, and video presentations on the control and tracking system (CATS) and the bin tracking system (BTS); the session lasted 1-day. Separate training sessions covered the more complicated operations such as split, repair, markup, and telephone assistance and followup.

**Technical training**—Technical training for operators of the FACT 90 system (camera, film processing, and FOSDIC) and for the laser sorter was conducted by section chiefs and technical specialists. The FACT 90 section chiefs, who were trained by the KCPO technicians, trained their operators using materials developed by the KCPO FACT 90 staff and coordinated by DOD staff. Training for the laser sorters was conducted at each PO by staff from the JFPO who were experienced with the multipocket laser sorters. An integral part of the technical training was the presentation of a “Theory of FOSDIC” video—an overview of the FACT 90 system that explained the scanning of the questionnaire images and demonstrated causes for unsuccessful reading of data by FOSDIC. Since many of the latter staff were employed in previous operations such as open/batch, data preparation, and camera preparation, this video was shown to all PO operations training sessions to ensure that these staffs understood the importance of doing their job properly.

**Clerical training**—Classroom training was designed for most clerical positions. For very easy tasks, reading the procedures and/or watching a video presentation of the operation was sufficient. For these, trainees observed someone doing their job on video and then performed the job under the guidance of their unit chief. A lecture usually introduced the video, and question-and-answer sessions were scheduled at the end or as part of the video presentation. This approach was designed to relieve the trainer from the need for delivering a full range of information and to standardize training. For some operations, such as surname keying and split, training provided hands-on experience.

Trainee materials included an evaluation form and a final review or qualification test. These tests reviewed the trainee’s job comprehension and enabled the trainer to use another evaluation tool to determine if the employee should be assigned a job. Trainees were asked to complete two different evaluation forms: One was presented immediately at the end of training to assess the effectiveness of the



training materials and instruction; the other, after the employees had been on the job for a few weeks, assessed the effectiveness of the training in light of their work experience.

## Payroll

The staffs in the PO's were composed of a few permanent and many temporary employees. Permanent employees were paid according to the standard civil service scales for their respective grades, while temporary position pay rates were determined administratively. The PO's personnel units were responsible for timekeeping for all employees at their sites, but the actual payroll operation was handled through the National Finance Center (NFC) of the Department of Agriculture. Its automated system was capable of providing quick responses to payroll inquiries.

As mentioned previously, the PO's were divided into management areas, branches, sections, and units. Each unit was assigned a timekeeper and an alternate to transcribe the payroll data from a cost and progress report (maintained daily by each employee and turned in each week following his or her supervisor's approval) to a time and attendance report (the basic document used in the NFC system). It contained information required to compute pay in accordance with the guiding U.S. laws. It also provided the Bureau with valuable accounting information. Timekeepers had a Time and Attendance Manual, Form D-2667, for duty instructions.

The NFC computed employees' pay and transmitted the information to the U.S. Treasury Disbursing Office for preparation of salary checks. Employees were paid every 2 weeks, for a period beginning at 12:01 a.m. Sunday and ending at midnight on the second Saturday. The Treasury Department forwarded issued checks to the PO manager, who had them distributed to all employees on payday.

Each PO's working hours were determined by the PO manager. Under no circumstances were employees allowed to work overtime without the written approval of their supervisors. Overtime was defined as "any scheduled time worked in excess of 8 hours a day or 40 hours a week." When employees were authorized to work overtime, they were paid at one and one-half times their basic hourly rate, with an overtime ceiling of \$18.87 per hour. Employees authorized to work between the hours of 6:00 p.m. and 6:00 a.m., as part of their regularly scheduled administrative work week, were paid their basic rate plus a 10-percent "night differential" and any overtime, if applicable. Employees working on a holiday were paid "double-time"—their regular rate of basic pay plus holiday pay. Holiday pay was equal to their rate of basic pay for any hours worked up to 8 hours. Hours worked over 8 were paid at the overtime rate.

The following is a list of selected entry-level pay rates for PO positions:

### Entry-Level Pay Rates for Processing Office Positions

| Position  | Entry level pay rate (per year) |
|---|---------------------------------|
| Processing office manager.....                                | \$59,216                        |
| Processing office assistant manager.....                      | \$50,342                        |
| Processing office branch chief.....                           | \$42,601                        |
| Systems manager.....  | \$30,216                        |
| Supervisory technical operations specialist.....              | \$25,377                        |
| Supervisory operations specialist.....                        | \$24,613                        |
| Administrative operations supervisor.....                     | \$23,265                        |
| Supervisory administrative specialist.....                    | \$19,819                        |
| Automation operations specialist.....                         | \$21,932                        |
| Operations specialist.....                                    | \$21,273                        |
| Clerk.....  | \$11,479                        |
| Lead clerk.....   | \$14,400                        |
| Supervisory clerk.....  | \$16,114                        |
| Clerical supervisor.....                                      | \$17,949                        |
| Data entry clerk (included personnel and payroll clerks)..... | \$14,445                        |
| Lead data entry clerk.....                                    | \$16,114                        |
| Supervisory data entry clerk.....                             | \$17,949                        |
| Entry operations supervisor.....                              | \$19,859                        |
| Secretary (manager's).....                                    | \$17,949                        |
| Secretary (assistant manager's).....                          | \$16,114                        |
| Secretary (branch and staff chief's).....                     | \$12,000                        |
| Peripheral equipment operator.....                            | \$12,591                        |
| Computer operator.....  | \$16,114                        |
| Supervisory computer operator.....                            | \$17,949                        |
| Laborer.....  | \$19,247                        |
| Lead laborer.....   | \$21,194                        |
| Warehouse laborer supervisor.....                             | \$28,148                        |
| Forklift operator.....  | \$21,250                        |
| Motor vehicle operator.....                                   | \$23,049                        |

### Automated Data Processing Structure

The Census Bureau required fast, accurate ways to capture and process large volumes of data for the census. The data control system (DCS) was a group of computer programs that generated files used to control data capture and storage for the 1990 census. Most of the data captured from the questionnaires were stored in computer memory and on computer tape and later tabulated and prepared for publication. The DCS also contained manually keyed census data files, FACT 90 (see ch. 8) files, and processing files and CATS files. The major objectives of this system were to:

- Transfer data from paper forms to computer files.
- Control and track the movement of the paper questionnaires through the various processing steps.
- Process and manipulate the data.
- Create final 100-percent (short form) and sample data (long form) capture files for publication.

Three computer systems were involved in data capture during the 1990 census. One system, housed at HQ, stored the data capture files. (The keying/data entry operations and CATS were operated on the systems in each of

the seven PO's. Data files created in the PO's were sent via telecommunication lines to HQ.) The second system was for practically all other PO computer operations. The third system involved software written in Pascal (a standard computer language) on a microcomputer to direct the FOSDIC scanner (see ch. 8). For backup, all files could be converted to other systems.

The DOD prepared the program specifications and codes and was responsible for the development and control of the DCS. While PO personnel conducted all data-capture operations and were responsible for daily operations, the TSD was responsible for the maintenance of the laser sorters and the FACT 90 equipment (high-speed cameras, film processors, and FOSDIC).

The information on completed questionnaires had no value until it could be translated into a computer-readable format for tabulation. The data-capture programs produced the data files used during processing operations and ultimately for tabulations. The DOD used commercial software on its minicomputers to develop the data-entry software, a basic module with default subroutines that could be modified for various operations. The DOD tailored this software for all essential data entry requirements, including special forms and long-form questionnaire keying.

Keying operations were necessary to capture write-in entries because the FOSDIC scanners could not interpret written responses on the questionnaire. In addition, keying was used to capture information from questionnaires that were not FOSDIC-readable, such as the Individual Census Reports (ICR's, see ch. 6), and for operations such as surname keying and group-quarters keying. The DOD programmed the following quality checks into the software for keying operations:

- Alphabetic entries entered in alpha-only fields and numeric entries entered in numeric-only fields.
- Range checks on all appropriate fields.
- Batch-end edit that ensured that the number of documents keyed was within the allowable tolerance of the number of documents expected.
- Keying control file contained one record for each batch being processed.

## Telecommunication Equipment

The telecommunication system provided voice and data communication capabilities between the field offices and HQ for the 1990 census. The data telecommunication system used dedicated leased lines to connect the beta site (see p. 15), each of the 13 RCC's, the 12 RO's, each of the PO's, and the DPD to HQ. The RO's were included in this system to serve as emergency backups to the RCC's.

The PO's used the telecommunication system to transmit payroll and personnel information and for other administrative applications such as electronic mail and the transmission and confirmation of the receipt of captured data.

The administrative offices of the RO's used the same system for cost and progress reporting, payrolls, and communications with their respective DO's.

The voice telecommunication system consisted of local telephone service, long-distance service, and toll-free "800" service. In addition to the administrative uses of these systems, they were used to conduct three major decennial operations: Telephone questionnaire assistance (see ch. 8); telephone followup (see ch. 8); and the "Were You Counted" campaign (see ch. 6). The administrative systems also included a 24-hour employee "hotline," on which PO employees could call a "1-800" number to report concerns or abuses to HQ.

Each RCC leased two dedicated lines, while each PO (except Jeffersonville and Baltimore) leased three dedicated lines. The JFPO and the DPD communicated with HQ via the "T1" line.<sup>2</sup> The BAPO had one dedicated line in addition to a "T1" line for maintaining the address control file (ACF) (see chs. 4 and 6). The beta site was linked to HQ via a dedicated leased line.

The Bureau experienced and corrected performance problems (such as excess background noise from line software) with the two T1 telecommunications lines connecting the BAPO, beta site, National Support Center (NSC), and HQ. These difficulties delayed ACF updating at HQ, but they were resolved in time to avoid any major problems in later operations.

The dedicated-line network from the PO's to HQ was used primarily by the DOD. The PO's transmitted administrative and production data on a flow basis during the week. Administrative transmissions included payroll, personnel, management information system (MIS, see ch. 6), and procedural data, while production transmissions included all processed FOSDIC output and keyed data.

There was some uneasiness that a telephone workers' strike in the New York area would delay the installation of 60 lines and 90 instruments in the ABPO, but they were connected in time for all operations.

## Security

Processing center operations required the temporary storage of massive amounts of confidential materials. Security was a major concern because of the risks of (1) destruction of the original questionnaires, (2) violation of the confidentiality of census records, and (3) damage to a variety of automated data processing, microfilming, and FOSDIC equipment—all vulnerable to fire or water damage. Each PO had a number of area security officers to assist in the overall security program. The POM had overall responsibility for office security but appointed the Assistant Manager for Administration (AMA) as the supervising security officer, responsible for the protection of employees and property and the safeguarding of census-confidential information. In addition, the AMA ensured that all new employees received adequate instructions on security responsibilities, regulations, and procedures. Additional security

<sup>2</sup>A dedicated digital transmission link.

positions included a security coordinator for the ADP areas and area security officers responsible for implementing and enforcing security procedures and reporting violations in designated areas.

**Physical security**—Access to the PO's was tightly controlled. Uniformed guards were stationed at all pedestrian entrances and exits. Fire control systems (including smoke detectors, fire extinguishers, and alarms) were installed, and damage control systems were developed. No one was hired until a security investigation had been completed with satisfactory results. Identification badges were issued to every employee after hiring and were to be worn at all times while on duty. Access to areas of the office containing confidential information was limited to Bureau employees who were sworn to protect that confidentiality. Only employees working on the post enumeration survey (PES) were allowed in the PES processing area. (For more on PES, see ch. 11.) Every employee was responsible for knowing and adhering to all security policies, as well as alerting supervisors to possible flaws in security. All visitors to the PO's were required to sign a visitor's register at the guard station and obtain special visitors' identification badges, to be worn at all times while inside census processing areas. Security personnel circulated copies of security guidelines to all employees on a quarterly basis.

Access into and out of Census Bureau space was controlled by a combination of methods, such as: Locked doors (no exit permissible), locked doors with "emergency exit" hardware and alarms, cipher locks for entry into ADP areas, cylinder locks with master keys, uniformed guards to control pedestrian entrances and exits, roving security guards to patrol areas of the PO, security guards and/or employees to control access through loading dock doors, security fences, and intruder alarms. All individuals entering or leaving Census Bureau areas were subject to a search of their personal property, according to Government regulations.

All employees had to sign statements in which they swore not to divulge any personal information contained in completed questionnaires, microfilmed copies, address registers, and similar restricted materials. The Bureau required strict adherence to Federal laws requiring the absolute confidentiality of data relating to individuals.<sup>3</sup> Only sworn Census Bureau employees or agents were permitted in areas where documents containing confidential census information were stored or processed. Questionnaire details concerning individuals were not to be discussed by employees, except as necessary for official purposes. Regulations prohibited the presence of cameras in Census Bureau occupied space unless headquarters granted approval in advance. Any type of reproduction or photographing of census-confidential materials, such as for on-site filming of a news event, was prohibited.

<sup>3</sup>Title 13, U.S. Code, authorized the Secretary of Commerce (who delegated the authority to the Census Bureau) to take the 1990 decennial census and required that the Bureau maintain the confidentiality of the information provided by respondents. For more information about Title 13, see chapters 1 and 12.

Controlled areas had special security requirements. Areas in which census-confidential documents and equipment were received, processed, or stored were identified by posted signs saying "CENSUS RESTRICTED AREAS—AUTHORIZED PERSONNEL ONLY." These areas were physically separated from general work areas by the use of existing walls or the placement of furniture, cabinets, steel shelving, etc.—to form perimeter walls. Access to controlled areas was limited to those employees directly involved in the operation. Only supervisory personnel had keys to the locks.

**ADP security**—The security policy for the camera and ADP areas required that such things as cameras, FOSDIC equipment, video-training equipment, data-entry equipment, and film-processing equipment receive special protection from unauthorized use and malicious damage. An ADP security coordinator controlled physical access to the ADP area, developed an inventory of ADP equipment and kept it updated as necessary, devised and maintained an ADP security plan, coordinated awareness and training related to the plan, and maintained a log of security violations.

The ADP areas were secured with cipher locks and/or deadbolts. Only people whose jobs required access to these areas had the cipher combination and/or keys. All ADP areas had to be locked when unattended. Any visitors to the ADP areas had to have the approval of the ADP security coordinator and be escorted at all times. Also, an ADP escort had to be present if these areas were to be cleaned after working hours.

Computer terminals were used for entering the required data for the automated control and tracking system (CATS, see ch. 8) which monitored the flow of work in the PO and captured operational data for status reports (management information system), quality assurance, and general production. These terminals were located at key control points throughout the PO's, but not always in areas that could be secured to meet minimum terminal and data security requirements. To prevent unauthorized use, several security measures were used:

Once the terminals had been unlocked (with the key) and turned on, several software safeguards protected the entry system. Once "logged in," users generally had access only to a single operation and only a few functions within that operation. This severely limited the amount of damage any user could do and provided for easy tracing of the user. All computer files containing confidential data included a file protection program.

Other security measures included "captive" users who had passwords and were limited via program and command procedures to only one operation and had no access to the digital control language. Files and data directories containing individual, and therefore confidential, data were protected by software that prohibited unauthorized access. Only HQ programming staff and the PO system managers (and backup) had access to the digital control language.

## THE BETA TEST CENTER

### Organization and Purpose

The beta site<sup>4</sup> was established in the BAPO in February 1988 to serve multiple purposes. The beta site provided an opportunity for Census Bureau personnel to test software, prior to release, on computer systems that were nearly identical to the decentralized operating unit systems. The site allowed applications programmers from the various decennial divisions to test programs intended for use in the PO's, RCC's, and DO's. Additionally, this site isolated problems and "faults" in the software before any widespread damage could occur and also resolved post-release difficulties. This was accomplished by duplicating the hardware/software environment at the targeted site and replicating the problem to identify and isolate the causes. A copy of every software release remained at the beta site.

### Staffing

Bureau as well as contract personnel staffed the beta site and the NSC. The DOD developed the requirements and wrote the task orders for these personnel. The beta site and the NSC operated two or three shifts (8 hours per shift) depending on the workload. Daytime shifts required about 19 contract personnel, while the night shift required approximately 10 contract employees. The DOD awarded a contract through the General Services Administration (GSA) in August 1988; this was renewed yearly through 1991.

Although the beta site was operated by contractors who were sworn Census agents, Title 13 (confidential) data were allowed in the facility only when a Bureau employee was present and responsible for their use.

### Testing

The beta site was open for users from 7:30 a.m. until 6:30 p.m., Monday through Friday during the census, although Fridays were reserved for emergency use. Users requested time slots through their divisional coordinator. The desired time, program to be tested, special requirements, number of attendees, configuration needed for testing, and a contact person's name had to be listed on the user's request. The test center also provided an opportunity for analysts to validate procedures and training packages that interfaced directly with applications software packages. The beta site ran three types of user tests:

- **Programmer "hands on" testing.** This type of testing gave programmers time to load and run a program or series of programs in the actual hardware system environment prior to the final testing by users. Analysts and trainers had a chance to use the software prior to the development of final procedures and training manuals.

- **Programmer/analysts procedural implementation testing.** This testing allowed procedures writers and trainers to work with the programmers to validate the software, manuals, and training packages prior to their release to the PO's, RCC's, and DO's.
- **Final pre-release testing.** This test assured that the software could be loaded on the decentralized systems.

### National Support Center (NSC)

The beta site had within it a national support center (NSC), which coordinated the release and subsequent installation of all applications software in the decentralized sites. By doing this through one central location, consistency was maintained; in addition, fault-isolation and problem-resolution activities were improved. The NSC certified the security of new software and controlled the release of new computer programs, tables, and files to the various 1990 census decentralized offices.

The NSC's "hot line" service supported the various decentralized operating units. Personnel logged the reported problems, contacted designated census personnel, and participated in the beta site's problem-isolation activities.

### Electronic Problem Referral System

The need for an orderly and systematic method of maintaining and properly distributing all hardware, operating and application software, network, and clerical problems and resolutions was most important during the 1990 census. To meet these objectives, each PO referred problems through the NSC electronic mail system designed to communicate problems, suggestions, and procedural changes between HQ and the PO's. It was a combination of menu-driven software and the conventional mail utility. The menu system was used for initiating and managing problem reports. The procedures control unit (PCU), located in each PO, coordinated all PO problem referrals and resolutions sent between the PO and the NSC. The PCU also kept a log of all software release documentation.

The NSC system handled three kinds of reports: Pending reports were those in which a PO had referred a problem that had not yet been resolved. Resolved reports were complete and indicated a problem resolution. "For your information" reports included pending and/or resolved reports sent to other PO's for informative purposes.

To create an NSC referral, authorized users completed a standard form with pertinent information about their concern. New referrals were routed through the NSC to the Bureau (if created in the PO's) or to the PO's (if created at HQ). Bureau HQ staff wrote resolutions for referrals received from the PO's, and they were sent back to the PO's by the NSC. The PO's referred all problems (equipment, software, clerical, and procedural) to the NSC. The NSC only handled problems from the RCC's concerning hardware, operating systems, or software installation.

<sup>4</sup>The software industry uses a practice called "beta testing" in which new software programs or revisions are tested before release to production operations or, in the case of commercial software, before sale to the public. Source: *Wall Street Journal*, July 30, 1992, p. B-1.

## Software Certification and Release

The DOD followed a series of steps to release software. Releases either contained all software to be released or none at all. Each released file was assigned a version number that did not change when all other PO's installed these files. An informational release note was prepared and forwarded to a distribution list which included HQ staff, beta staff, and security.

A kit containing an install command and other commands was prepared and sent to the NSC. The NSC loaded this on the beta site machine where it was tested and security certification took place. Upon clearance for release, the release note was forwarded to a broad distribution list. This note sometimes contained instructions to the system manager, especially for operation startup, but normally included instructions for setting up default laser printers, starting and printing reports, and finding passwords for users if they forgot them.

The systems manager at each PO installed the kits. The installation at the PO's was a backup/overlay that created new versions of the updated software or replaced files that were not updated with identical files.

When certified, the releases were sent to the appropriate facilities. Releases containing software went to all PO's and RCC's; whereas, releases with support files went only to those PO's performing the specific operation.

## INTEGRATED TEST OF CENSUS OPERATIONS (BAPO)

The DOD conducted an integrated test of all 1990 census operations at the BAPO from January 9 through January 26, 1990. This was the last major opportunity to evaluate and fine-tune the procedures, software, and training approach for the 1990 census processing. The objectives of this test were to:

- Test the feasibility and workability of the operational procedures and software.
- Test the internal processing and administrative control systems.
- Assess the design of the overall instructional strategy.
- Assess the design of the workflow in the PO environment.

Live data from the 1988 dress rehearsal (see ch. 2) were transcribed to 1990 documents to create test decks for the integrated test of workflow management, quality assurance, BTS and CATS systems (see ch. 8), film duplication control, the NSC, as well as other facets of processing and control.

The KCPO staff transcribed approximately 132,000 dress rehearsal questionnaires between August 15, 1989, and November 3, 1989. Two-thirds of the questionnaires were type 1, with the remaining third type 2/3. Forty percent of the type 1 questionnaires required surname keying, and 50

percent of the type 2/3 were enumerator-friendly questionnaires. Eighteen percent of the questionnaires were sample forms. In addition to these questionnaires, the DOD created "salted" camera units (CU's) that contained known errors to provide an additional check on the automated edit operation. All questionnaires were monitored to determine their processing status.

Questionnaires for type 2 and 3 district offices (DO's) were shipped to the BAPO over a period of several weeks to simulate 1990 DO questionnaire shipments. Transcribed type 1, mail-return questionnaires were inserted into envelopes and sent in one bulk shipment to the PO to simulate the arrival of large quantities of mail returns expected after the mailout.

The POM's, assistant managers for operations and ADP, and selected branch and section chiefs from all PO's observed and participated in this test. All of these people, except the managers and assistant managers, acted as clerks and/or keyers in the processing units to better understand and learn the operations.

A management decision process was developed to review problems, assess the effect of any proposed changes, and coordinate any changes to be made. This process applied to procedural as well as software changes. Staff that performed the various operations used the NSC to document all problems and changes. Upon successful completion of the test, all corrections and modifications were incorporated, and the procedures, training, and software were finalized.

In late February and early March 1990, some of the 132,000 questionnaires used for the test were sent to the other PO's for on-site "dry run" tests of their systems.

Overall, the PO procedures and software performed well, but nearly every program and procedure manual was updated with enhancements and/or corrections. The videos, computer-assisted training, and verbatim training packages were well received, although training writers incorporated changes into their packages after these dry runs. Various procedures were added or stressed in more detail for check-in, surname keying, data preparation, camera preparation, and other operations.

## CLOSING THE PROCESSING OFFICES

### Disposition of Title 13 Materials

The APSD assisted the DOD in the preparation of the Request for Records Disposition Authority (Form SF-115), which was reviewed by the National Archives. The SF-115 schedule covered records and other confidential materials that were either received or produced by the PO's.

The authorization to dispose of records containing census data, when approved by the GSA, allowed the Census Bureau to sell the waste paper products from the 1990 census. Approximately 6,000 tons of paper materials needed to be processed. The advertisement for the sale of paper products was printed in the *Commerce Business Daily* on

October 23, 1990. In addition, the GSA required the Bureau to advertise the sale of paper in a local newspaper in each PO city for 1 day; this was done in mid-December 1990.

Twenty-five companies requested solicitation packages (the Jeffersonville PO was dropped from the solicitation package because the GSA signed a contract for the sale of waste paper for the entire DPD facility in Jeffersonville), and contracts were awarded to four to dispose of waste paper in six PO's. All companies were responsible for posting a \$5,000 performance bond for each PO awarded. PO managers were notified of the removal and provided a schedule for removal.

All paper-disposal contracts required that all confidential material be pulped, macerated, shredded, or disposed of by means that totally obliterated printing and handwritten entries. Census confidentiality was maintained at all times while the records were in transit and until the destruction was completed. Every person having contact with confidential data took the "Oath of Office"; this included truck drivers and any personnel loading material at the PO's. Employees who handled confidential materials at shredding/pulping facilities were administered the oath by Bureau representatives on site. Regional office employees accompanied confidential records while in transit and were present at the disposal site. The Bureau allowed the contractors to choose the method of disposing of nonconfidential materials.

Several of the contractors experienced problems with the sticky black tape applied to the long-form questionnaires that denoted the end of information. The tape was nonbiodegradable, and the glue caused the pulping machine screens to clog, slowing the pulping process. The cardboard boxes used to hold the questionnaires lowered the overall pulp quality. The paper disposal process was completed by June 13, 1991, for all PO's.

Some documents were retained at the DPD for sampling and evaluation.

### **Disposition of Furniture, Equipment, and Other Materials**

Upon completion of 1990 census activities, the Bureau was responsible for the physical contents of the PO's. The POM was the property custodian for all Government-owned or -leased property in the PO. The APSD developed a preliminary disposition plan with the assistance of the FLD, the Directors' Office, and the DPD; the Census Closeout Working Group (CCWG), which included all divisions involved in the census, finalized this plan. Prior to closing, the APSD inventoried all equipment (except furniture) located in each PO, except for Jeffersonville. The APSD sent a complete inventory from each PO to the DPD, so it could select any

desired furniture or equipment, and a generic list of available excess equipment (not including furniture) to HQ divisions for the same purpose. The DOD provided the CCWG with a list of PO items for Bureau retention. If no other Federal agency wanted these items, the GSA, through the use of transfer forms, was the only Government agency authorized to select donees for the excess PO equipment and supplies. Furniture and other office equipment were returned to the Commerce Department, Bureau of the Census, or to lessors through the GSA, shortly before the PO's were closed. There were approximately 220 shipments of closeout materials sent to Jeffersonville from the PO's at a cost of over \$260,000.

The processing office coordination staff (POCS) sent other disposition instructions to the PO's. The TSD completed the deinstallation of the cameras and film processors and removed and packed the FOSDIC equipment, including spare parts. Most of the cameras, film processing machinery, and FOSDIC equipment was shipped to and stored at the DPD in Jeffersonville as part of its normal function. The DOD coordinated the disposition of all ADP equipment and supplies with the TSD.

The 222 microfilm access device (MAD) units were deinstalled in two phases. In early February, maintenance was reduced on all but 10 units at each PO. If the units under reduced maintenance required repair, the PO's paid for this on a time-and-material basis. When there was no further need for the 10 remaining units at each PO, these units were disconnected, and the TSD arranged to have them shipped to the DPD in Jeffersonville.

The PO's reassigned or terminated all employees on or before the PO closing dates. Credit cards issued to PO personnel were returned to the POM, who destroyed each card and closed these accounts. Generally, the PO's closed in increments; that is, as one operation was completed, personnel were reassigned or terminated, and equipment was transferred or excessed when it was not needed. Each lessor was notified of the effective PO closing date, as required by the terms of each lease. All services and utilities were canceled or disconnected and, finally, control of the facility was returned to the lessor.

The following list shows when each PO closed. The San Diego, Austin, and Albany PO leases were bought out due to their earlier-than-anticipated closing times.

| <b>PO</b>          | <b>Closing Date</b> |
|--------------------|---------------------|
| San Diego, CA      | June 1991           |
| Albany, NY         | June 1991           |
| Austin, TX         | June 1991           |
| Kansas City, MO    | August 1991         |
| Jacksonville, FL   | August 1991         |
| Baltimore, MD      | September 1991      |
| Jeffersonville, IN | March 1992          |

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# SELECTED ABBREVIATIONS AND ACRONYMS USED IN PRETABULATION CENSUS PROCESSING

|         |  |          |  |
|---------|--|----------|--|
| ACF     | address control file                               | ID       | identification (number)                |
| AF      | address file                                       | MAD      | microfilm access device                |
| ARA     | address register area                              | MCR      | military census report                 |
| BSA     | basic street address                               | MIG      | migration                              |
| BTS     | bin tracking system                                | PES      | post enumeration survey                |
| CATS    | control and tracking system                        | PO       | processing office                      |
| COW     | class of worker                                    | POB      | place of birth                         |
| CU/FN   | camera unit/frame number                           | POB/MIG/ | place of birth/migration/              |
| CU      | camera unit  | POW      | place of work                          |
| CUID    | camera unit identification number                  | POP      | Population Division                    |
| DCF     | data capture file                                  | POW      | place of work                          |
| DDP     | data-defined person                                | PPIR     | parolee/probationer information report |
| DO      | district office                                    | QA       | quality assurance                      |
| DOD     | Decennial Operations Division                      | RCC      | regional census center                 |
| DSSD    | Decennial Statistical Studies Division             | S/M      | search/match                           |
| FACT 90 | film and automated camera technology 1990          | SCR      | shipboard census report                |
| FIFO    | first-in, first-out                                | SFCF     | State and foreign country file         |
| FOSDIC  | film optical sensing device for input to computer  | STSD     | Statistical Support Division           |
| GAF     | geographic areas file                              | TAR      | tape address register                  |
| GEN     | general coding                                     | TSD      | Technical Services Division            |
| GEO     | Geography Division                                 | USPS     | United States Postal Service           |
| HHES    | Housing and Household Economic Statistics Division | WF       | workplace file                         |
| I&O     | industry and occupation                            | WHUHE    | whole household usual home elsewhere   |
| ICR     | individual census report                           | WMU      | workflow management unit               |
|         |  | WU       | work unit                              |
|         |  | WYC      | Were you counted?                      |

# CHAPTER 8.

## Pretabulation Processing

### INTRODUCTION

A major strategy for the 1990 census was the implementation of concurrent processing, the conversion of census questionnaire data on an individual form-flow basis so that they could be edited and corrected concurrently with field operations. For the 1980 census, data capture did not occur until a field office closed and shipped its questionnaires to the processing offices.

Seven processing offices (PO's) were responsible for processing the census questionnaires (see ch. 7). The PO's converted questionnaire responses into machine-readable form for subsequent tabulation and publication of the data.

This chapter describes the processing flow from questionnaire receipt to library storage. Chapter 7 describes PO site selection, equipment installation, organization, staffing, recruitment, training, and closing the PO's.

### General Procedures

In censuses prior to 1990, DO-based automation was not feasible. The Bureau normally split the decennial census operation into manual-collection offices (DO's) and one or more centralized, automated, data-capture offices (PO's). This meant that questionnaires could not be individually identified or tracked through the various processes. A DO's work could not enter the automated data processing (ADP) operation until the office was ready to close. Questionnaires that had arrived during the first days of the census sometimes had to wait for months for the arrival of the remaining documents before being forwarded from the DO to its PO. The content and completeness of a shipment were manually controlled.

Questionnaire processing for the 1990 census began almost immediately following the mailout of the questionnaires on March 23, 1990. PO's received questionnaires on a flow basis, and processing for the 1990 census began 5 months ahead of the comparable 1980 processing effort. The development of the address control file (ACF), with each housing unit and group quarters assigned a unique identification number, made this possible (see chs. 4 and 6).

### PROCESSING MAIL-RETURN QUESTIONNAIRES FROM TYPE 1 DISTRICT OFFICES

The USPS delivered questionnaires to most housing units (HU's) in the country. For housing units located in type 1 DO areas, respondents mailed completed questionnaires directly to one of six processing offices (the Kansas

City Processing Office (KCPO) was not assigned any type 1 DO's). The PO return address was printed on the return envelope; the USPS received these mail returns and sorted them by DO and by short- and long-form type at its large distribution centers.

The shipping and receiving unit in each PO received bins containing trays of unopened questionnaires from the USPS and routed them to the check-in unit via the workflow management unit (WMU). The receiving units remained open from February 26 through December 1, 1990.

### Check-In Unit

Using laser sorters, this unit checked in and further sorted the census returns and opened their envelopes for subsequent questionnaire removal and processing. Clerks removed the returns from their delivery trays and fed them into a large laser sorter that read the census bar code (visible through a window in the questionnaire envelope) and sorted the questionnaires into five categories that identified surname and nonsurname short- and long-form questionnaires and "other." This last group contained rejected returns where the sorter could not read the questionnaire bar code, or machine failures where the bar code reader could read, but mechanically could not sort. While sorting, the machine simultaneously recorded the returns as received and opened each envelope. Only 4 percent of the questionnaires had to go through two sorts to check on the post office DO sort, while 96 percent went through one sort in the check-in unit.

To maintain a high level of quality and reliability, a test deck of sealed envelopes was periodically run through the sorters. This test deck verification assumed that the bar code reader functioned properly but that the mechanical components of the machine might fail and thus require maintenance. Each PO received four complete, unique test decks. Each test deck consisted of the four combinations (long, short, surname, and nonsurname). These test decks were replaced throughout the operation when the sorter operator considered a test deck to be damaged. Each PO's test deck varied in length, depending upon the number of DO's assigned to the PO.

Questionnaires that could not be read after two passes were checked in by wands (hand-held bar-code readers) or by manually keying the questionnaire identification (ID) number. After wanding or keying, these questionnaires were sorted into the four groups described above. The check-in units processed approximately 10.7 million questionnaires from March 26 through May 9, 1990, with peak staffing of 180 employees in the 6 PO's receiving questionnaires from type 1 areas.

## Open/Batch Unit

After the questionnaires were sorted by DO, type, and surname/nonsurname, they were sent (still inside their opened envelopes and in the mail trays) to the open/batch unit. The workflow management unit delivered questionnaires from the check-in unit to the open/batch unit on rolling bins. Each bin contained only one questionnaire type. Here the questionnaires were removed from their envelopes, unfolded, and placed into boxes by DO, long and short form, and surname and nonsurname. Batch clerks used highly accurate weight scales as their main device to count 450 short forms for each short-form box and 100 long forms for each long-form box. Each box was assigned a unique number code for identification and tracking. Nonsurname questionnaires were sent to the data preparation unit (see below), while the surname questionnaires went to the surname keying unit. The open/batch units processed the same number of questionnaires as the check-in units and were staffed as long, but since their function was more manual in nature, they had peak staffing levels of 716 people.

## Surname Keying Unit

Short- and long-form questionnaires requiring surname keying were those from multiunit structures and housing units without house-number/street-name addresses. Non-response followup interviewers used respondent surnames to help solve apartment mixups and as an aid in locating nonresponse units.

A control clerk assigned boxes of questionnaires to a keyer, who keyed the ID number on the questionnaire and the surname and first initial of the person listed in the first person column on each questionnaire. Questionnaires were placed in the same box in which they were delivered when they came into the surname keying unit. Surname keying ran from the start of mail-return check-in to the beginning of the nonresponse followup operation. The unit was open from March 26 until May 5, 1990. During that time, a peak staff of 381 people surname keyed approximately 4.7 million forms.

## Data Preparation Unit

Questionnaires came to the data preparation unit from the surname keying unit and the open/batch unit. As with all the operations described so far (except receiving), the data preparation unit handled only type 1 DO mail return questionnaires. During data preparation, clerks completed item A, "Total People," and item B, "Type of Unit," in the "For Census Use" box on each questionnaire. They also placed black tape on the last completed person-page for sample questionnaires (long forms), so that blank pages would not be filmed.

To complete item A (total persons), clerks counted the number of persons listed in question 1a (the household roster of everyone staying at the address and having no other home) and the number of person columns with a

name or at least one question answered, and filled the FOSDIC circle for the larger of these in item A. If question 1a and the person columns were blank, the clerk left item A blank. Later, when the questionnaire data were edited by computer, the computer count of the data-defined people (columns with at least two answers provided) and the entry in item A were compared. If these counts were different, the questionnaire failed edit and was sent to the markup unit (see p. 11) for review. This edited the form for coverage to ensure that the correct population count was captured.

The clerks also filled the FOSDIC circle in item B, which indicated the questionnaire was the first one received from a particular housing unit, not a continuation form. This was required by the computer edit for all questionnaires; since type 1 questionnaires came directly from the respondents, all questionnaires would have failed if item B was not completed.

If the circle in question 1b (where the respondent was asked to enter the usual home address if everyone at the questionnaire label address was there temporarily and lived somewhere else most of the time) was filled or there was a basic address in question 1b that was different from the address on the questionnaire label, the clerk filled the 1b circle in item F, coverage.

As a result of the integrated test (see ch. 7), there were some late revisions to the clerical procedures for this unit. One of these involved the additional task of completing item G for all late-add questionnaires that did not contain a bar code questionnaire identification number. This revision occurred less than 1 month before the operation began and prompted the printing of a new quality assurance form that did not arrive until after the start of the operation.<sup>1</sup>

Data preparation was a manually intensive operation that experienced large backlogs during the first 2 weeks of the census. To resolve these backlogs, some PO's trained and reassigned clerks from other operations. Over 2,159 people in 6 PO's worked in these units (and in the QA unit), processing 10.7 million questionnaires from March 26 through June 8, 1990.

Questionnaires that were damaged to the extent that they could not be processed were sent to an auxiliary unit in data preparation, called the transcription unit, where the questionnaire entries were transcribed onto clean, filmable questionnaires. These questionnaires were then sent to the camera unit where four boxes of the same type of questionnaires from the same DO were stacked together to make a camera unit (CU). Each CU was assigned a camera unit ID number by the control and tracking system (CATS) and contained preprinted density sheets (see p. 8) and box labels (affixed to the outside) with CU numbers assigned in numerical order.

## PROCESSING QUESTIONNAIRES FROM ALL DISTRICT OFFICES

Census questionnaires received directly from respondents (type 1 cases) and already through the data-preparation phase in the processing offices or that arrived from the

<sup>1</sup>1990 Census Preliminary Research and Evaluation Memorandum No. 131, Jan. 29, 1992.

DO's (type 2, 2A, and 3 cases)<sup>2</sup> proceeded to the PO's Film and Automated Camera Technology 1990 (FACT 90) operations. This stage encompassed the microfilming, film processing, scanning, and computer editing steps of the operation, and "captured" (i.e., converted to machine-readable form) information from paper questionnaires into computer files, which after further processing would be ready for tabulation. The PO's used a menu-driven database control and tracking system to monitor questionnaires and other materials during processing.

The USPS delivered mail-return questionnaires for type 2, 2A, and 3 DO's to the appropriate DO where they were manually sorted (short and long form, surname and non-surname), then batched by type, with 100 short- or 30 long-form questionnaires per batch. Each batch was checked into the collection control file (CCF)<sup>3</sup> by moving hand-held wands (bar-code readers) across a bar code that contained the unit ID's on the questionnaire. The surname was then keyed if the address on the form was a multiunit structure or did not have city-type delivery. The mail return check-in software contained a computer program that assigned a unique work-unit number and the check-in date for each mail-return questionnaire. Clerks used this number to control their work batches.

Type 2 and 2A DO's contained prelist, update/leave, and TAR areas. DO's processed update/leave questionnaires in the same way as the TAR and prelist mailout/mailback universe. Check-in, clerical edit, and telephone followup took place in each of these DO's, as well as in type 3 DO's, which included list/enumerate, prelist pockets, and TAR areas. (These DO processing operations are described in detail in ch. 6.)

Clerks in the DO electronic data processing area checked questionnaires that had passed edit in the DO on a flow basis before shipping them to their respective PO. They keyed or wanded (scanned) the questionnaire ID numbers and keyed the population counts from the questionnaires along with the assigned shipping box numbers so that the contents of each box could be tracked if lost during transit. Before packing and shipping long-form questionnaires to the PO, clerks applied black tape to the last data-filled page of each questionnaire.

These questionnaires were shipped to the preassigned PO and delivered by an overnight courier in color coded<sup>4</sup> and numbered boxes to the PO's receiving unit. Over

400,000 cartons containing completed questionnaires were sent to the 7 PO's. These questionnaires joined the processing stream at the camera preparation unit.

## CAMERA OPERATIONS

Camera operations were at the heart of the film and automated camera technology 1990 (FACT 90) system; every questionnaire had to be microfilmed, the microfilm processed, and the data extracted from the microfilmed records by FOSDIC equipment. Consequently, the seven processing offices each had extensive filming staffs and facilities. The basic major equipment allotments for the individual PO's were as follows:

| Processing Offices | Cameras |         | Processors |         | FOSDIC's |         |
|--------------------|---------|---------|------------|---------|----------|---------|
|                    | Active  | Reserve | Active     | Reserve | Active   | Reserve |
| Albany, NY         | 8       | 0       | 2          | 0       | 2        | 1       |
| Baltimore, MD      | 8       | 0       | 2          | 0       | 2        | 1       |
| Jeffersonville, IN | 10      | 0       | 2          | 3       | 2        | 1       |
| Kansas City, MO    | 11      | 0       | 2          | 1       | 2        | 1       |
| Jacksonville, FL   | 12      | 1       | 2          | 1       | 2        | 1       |
| Austin, TX         | 11      | 0       | 2          | 1       | 2        | 1       |
| San Diego, CA      | 11      | 0       | 2          | 1       | 2        | 1       |

The Bureau based these allocations on estimated workloads for the PO's, assuming (1) 1,328 work hours per week and a total of 83 work days; (2) a recycling rate of approximately 15 percent; (3) processing rates of 2,400 short or 640 long forms per camera per hour and 14,000 short or 2,800 long forms per FOSDIC per hour. The total camera/FOSDIC workload was estimated at 101,175,000 short and 20,724,000 long forms.

## Camera Preparation

The Camera Preparation Units received boxes of questionnaires from many areas in the PO. Before being microfilmed, questionnaires were arranged in CU's, groups of four boxes of short or long forms. Some boxes contained forms that had not yet been filmed—questionnaires from type 1 DO's, arriving via the data preparation unit and questionnaires from type 2/3 DO's via shipping and receiving. The other work units (WU's), arriving from markup, repair, and telephone followup, were known as "recycles" and had to be regrouped into new CU's of four boxes each. Clerks weighed recycled questionnaire boxes and added or removed forms until the appropriate number (450 short, 100-percent forms; or 100 long, sample forms) appeared on the scale.

For long forms arriving from type 2/3 DO's, clerks made a cursory inspection for black tape (used to signal the camera that it was filming the last filled-in page) and affixed the tape when missing. Only type 1 mail-return forms did not require weighing or black-tape checking. Clerks then made sure that all four boxes in the CU contained unfolded, flat questionnaires of the same type (they did not have to be from the same DO, although this was desirable) and

<sup>2</sup>The "type" identifications actually referred to the kind of district office that referred the report form to the processing offices. A *type 1 DO* covered large central-city areas (encompassing roughly 175,000 housing units), *type 2 DO's* generally covered smaller cities, urban/suburban areas, and some rural areas, while *type 2A DO's* covered similar areas and places with "seasonal" populations (resort regions and so on); *type 3 DO's* were responsible for sparsely settled rural areas.

<sup>3</sup>The CCF was part of the collection control system in the DO. The CCF resided on the DO computer and contained geographic codes (such as ARA and block numbers), unit identification numbers, and other identification information for all living quarters in the DO area. (For more detail on the CCF, see ch. 6.)

<sup>4</sup>DO clerks applied colored spots on their questionnaire shipping cartons, with each color representing a specific PO: KCPO—white, BAPO—black, JXPO—tan, SDPO—blue, JFPO—red, AUPO—gray, and ABPO—green.

assigned a unique CU identification (CUID) number from a preprinted sheet of labels.<sup>5</sup> A Camera Unit Identification and Density Sheet (CUID—Form D-1890), inserted inside the top box of the CU, served as a breaker sheet to identify the CU on the microfilm.

Assignment clerks took rolling bins of nine completed CU's each to the camera preparation quality assurance (QA) clerks. Using a random-number table, clerks selected a 1-in-9 sample of the CU's on the bin and verified that the chosen CU was acceptable. Possible errors included questionnaire boxes packed with the wrong type of questionnaire, CU's containing boxes of dissimilar forms, no CUID in the first box of the CU, an incorrect CUID, and no CUID showing through the window on the end of the box. The most common problem (50.4 percent of all errors) that the camera preparation QA procedures detected was the mixing of short and long forms within a CU.

In all the PO's, except Jacksonville, the weighted estimated CU error rate for the camera preparation operation was 0.03 percent. Error rates for the Jacksonville facility were considerably higher than those for the others because the QA clerks there mistakenly sampled one box per CU (a 1-in-4 sample) instead of one CU per bin (1-in-9), or did not consistently check for all types of errors as instructed by QA guidelines. Of the other six PO's, Kansas City had the highest estimated CU item error rate, probably because it processed only forms from type 2/3 DO's, which were more likely to have data preparation and packing errors than type 1 forms that had arrived directly and undergone data preparation in the PO's.

The camera preparation operation began on March 26, 1990, and lasted 40 weeks. Error rates generally fell over the first 14 weeks, with the exception of the weeks with the largest workloads. QA clerks did not record any errors after the 14th week. The higher error rates for the early weeks may have been due in part to the necessity of training some camera preparation clerks with "live" questionnaires, since training materials were not ready in time for the first training sessions.

## Camera Unit

Workflow management unit clerks took the completed CU's to the camera unit staging area, where the forms awaited microfilming. Camera units of questionnaires of a single type (i.e., either all long- or all short-form) were assigned to cameras on a first-in, first-out (FIFO) basis. Camera operators loaded film into the camera and filmed the CU's on one roll of 16mm film each, and jogger operators placed batches of questionnaires into the camera feeder hopper for filming, making certain that the

<sup>5</sup>The CUID number was a unique eight-digit identification. The first digit of each number identified the processing office handling the CU (1 (Kansas City), 2 (Baltimore), 3 (Jacksonville), 4 (San Diego), 5 (Jeffersonville), 6 (Austin), and 7 (Albany)), followed by a six-digit identification number, the first number of which indicated whether short ("1") or long ("6") forms composed the CU, with the last digit a check digit. For example, a CU with the CU identification number 4-100-0451 was a San Diego unit of short forms.

documents were properly aligned. Then camera operators took exposures of the density breaker sheet, followed by all the questionnaires in the CU. After filming, unloader operators removed the documents from the output hopper and returned them to their original boxes. The questionnaires proceeded to an output staging area and then to the split unit.

## Film Processing

Exposed microfilm rolls went to the film processing unit, where they sat in a holding area for at least an hour (but no more than 3 hours) to "age." Arranged by clerks in the order of the time they were filmed, the film rolls were assigned on a FIFO basis to film processor operators for developing. The operators took up to 10 rolls of film at a time into the darkroom and spliced them together on a large reel. The spliced film was wound onto a film magazine, which processor operators loaded onto the film processor for developing. During developing, the operators monitored processor speed, chemical levels, and temperature.

The film processing unit was the only section of FACT 90 that had authority to accept or reject microfilm based on quality. The QA operation had three primary goals: (1) to provide a uniform measurement of production film quality, (2) to assure that the FOSDIC unit received only film that passed strict QA inspection, and (3) to measure and record sensitometric control strips to determine if the processors' chemicals were properly controlled. The individual QA operators visually inspected each roll of film, conducted densitometer readings of control strips delivered for inspection, recorded the results of these inspections on the appropriate forms, and rewound the microfilm on FOSDIC reels.

Twice each day the film processing operators delivered three control strips to each QA operator for densitometer readings. The QA operator "zeroed" the densitometer (i.e., checked that the digital readout displayed three zeroes with nothing over the reading area when the "zero" button was pressed); then placed the first section of each control strip, emulsion-side down, over the reading area of the densitometer and pressed the control lever for 1 second; recorded the density measured by the equipment on a Form D-1939, Sensitometric Control Strip Worksheet; and repeated the process for each of the 21 sections of each strip. The operator keyed the results of each strip inspection into a computer terminal for transmission to Bureau headquarters and placed the completed form D-1939 in a three-ring binder for temporary storage.

The visual inspection of the microfilm was done while the operators rewound the film. They placed a reel of processed film on the left side of the rewind device and an empty FOSDIC reel, identified by its having one square hole and one round hole at the center (camera reels had two square holes) on the right side. The operator cut off any overexposed film at the end of the reel and checked to make certain that 72 inches of clear, unfogged leader

remained on the CU film. (If less than 72 inches remained, the operator spliced the necessary length of clear film to the end of the reel.)

To begin, the operator hand wound the microfilm onto the empty FOSDIC reel, stopping when the first Form D-1890, Camera Unit Identification and Density Sheet, was reached. The operator verified that the eight-digit CU number on form D-1890, matched the corresponding numbers on the film box, removed the CU number label inside the film box, and applied it to the partially wound FOSDIC reel. The operator then proceeded to measure film density by measuring the density of the first form D-1890 image on the densitometer, entering the resulting reading in the appropriate column of the Form D-1938, Film Processing Log. The operator wound the film to the first questionnaire image and, using a loupe, visually checked the image for fogging, clarity, unscratched and unobstructed document image, proper horizontal and vertical alignment, and any physical damage. Thereafter, each operator stopped the rewinding approximately every 50 feet to make the same visual checks, until reaching the D-1890 at the beginning of each roll. Again, the film density was checked using the densitometer equipment. If the inspection revealed no visible problems with the film, and the density readings taken were all between 0.80 and 1.20 on the densitometer, the operator transcribed the density reading from the D-1938 to the D-1890 label, marked the "pass" box on the label, transcribed the camera number from the D-1890 to the D-1938, signed the comments column of the D-1938, and gave the log sheet to the film processing clerk.

Any visible problems or density readings outside the acceptable range resulted in the operator failing the CU film, transcribing the necessary identification information from the label to the D-1938, and giving the film box and the D-1938 to the control clerk or film processing clerk. The defective film was placed in waste containers for disposal, and the questionnaires in the rejected CU had to be refilmed by the cameras.

If it passed the check, the film was cut into individual rolls and sent to the FOSDIC unit.

## FOSDIC PROCESSING

Each of the seven processing offices had two active FOSDIC machines, plus a third as backup in case of mechanical failure. The FOSDIC equipment located information on the questionnaires by calibrating the pages on the microfilm roll, referring to three marks to check the vertical and horizontal dimensions. Once it detected the data marks, FOSDIC used light sensors to measure the contrast in light intensity between the page and the filled-in dots (dark and light images, respectively, on the microfilm frame), identifying the answers on the questionnaire. Data captured by the FOSDIC were copied to the Bureau's computer system. The data were stored on the FOSDIC equipment's hard-disk memory storage until they could be transferred to the data capture file (DCF) for an initial content edit.

## FOSDIC Operations

Operators received CU's for FOSDIC processing from the unit control clerks and entered the CU number and starting time on Form D-1919, FOSDIC Log, keyed the CU number to the FOSDIC system memory, then loaded the microfilm into the equipment. The FOSDIC machines were capable of scanning the film at a rate of approximately 40,000 pages per minute (the equipment actually scanned 4 pages—2 frames of microfilm—per questionnaire), and upon completion of each CU, the operator entered the stop time in the log. The operator transferred the CU identification label from the original reel to the take-up reel and placed the reel in the appropriate film box, using the original supplying reel as the take-up reel for the next CU. The FOSDIC system electronically transferred the data read from each CU/film reel to the scanner's main computer system (the transfer required approximately 12 seconds per CU), then displayed a "transfer completed" signal to inform the operator the system was ready to process the next reel of film. The equipment automatically shut down reading operations when its sensors detected an "error" (e.g., the film was inserted with the emulsion side facing away from the scanners) or there was some mechanical malfunction. The operator then had to take whatever corrective action needed and rewind the film to start over from the beginning of the CU, since the FOSDIC system could read film only from the beginning of a reel.

Every hour the system made a "batch run," reading all the files ready for edit and generating an entry for the FOSDIC edit journal. Supervisors handled FOSDIC edit failures (e.g., microfilm that ran during a machine "crash" or that had content or structure errors) by running the film through FOSDIC again, or by refilming the defective CU. Operators returned completed CU's to the unit control clerks for staging.

As FOSDIC production operations began at the PO's, the controlling software detected image alignment anomalies at several of the FOSDIC stations. Investigation of the problem by the Bureau's Technical Services Division (TSD) revealed that the polarizing filters used on the camera lenses at several stations had been installed incorrectly, which caused fuzzy images on the production film. The filters were removed and reinstalled correctly, enabling production to continue.

Once production got underway, operators found that an unexpectedly high number of CU's failed to scan correctly. Investigation showed that the FOSDIC equipment was misreading some short-form questionnaires because of creases on the forms, apparently caused by improper folding by the respondents prior to insertion in their return envelopes and compression of the packages by sorting equipment at post offices. The creasing displaced the index marks on the pages of the questionnaires when they were filmed, causing index and/or calibration failures when the FOSDIC equipment tried to read the pages. The creases also could cause shadows that the FOSDIC sometimes misread as filled data circles or the presence of a write-in



entry. The Bureau corrected the problem by modifying the software controlling the FOSDIC equipment to have the computer check for the displacement of the index marks and flag the FOSDIC data records corresponding to the pages with more than a specified amount of mark displacement. These creased forms failed the computer edits and were routed to the repair unit, where clerks smoothed out the creases manually and recycled them through the FOSDIC equipment to ensure that the data were captured correctly.

### Film Staging and Duplication

Developed silver film continued to the film staging area, where it was held for 3 days—to ensure that the data captured from the film had been successfully transferred to the DCF—before shipment to the Jeffersonville PO for duplication. Clerks entered the CU identification information into the CATS to enable each office to keep track of all its materials as they passed through the processing system and prepared the microfilm boxes for air express shipment to Jeffersonville.

The Jeffersonville PO made two diazo duplicates of the original silver archival film.<sup>6</sup> The silver film ultimately was deposited in the National Archives, while the diazo copies were returned to the originating PO's for further processing operations.

### COMPUTER EDIT

The data in the FOSDIC files were transferred to the DCF and subjected to a computer edit. This initial run performed two types of edit: (1) a content edit to identify and reject questionnaires with missed or multiple answers and (2) a coverage edit to identify questionnaires with persons missing.

Both the content and coverage edits were applied to data captured from type 1 area questionnaires (i.e., questionnaires generally from large metropolitan areas). For the type 2/2A/3 areas, the DO's performed clerical content and coverage edits with a final check of the person-count being performed in the PO's on the questionnaires from these areas.

Depending on the type of questionnaire, eight different content edits on the DCF checked whether a sufficient number of questionnaire items were answered; if more than a specified number were missing, the questionnaire failed the edit. The only flag the content edit printed on the diary was the "S" flag, which signified that the number of "data-defined people" (DDP)<sup>7</sup> on pages 2 and 3 of the long

<sup>6</sup>Silver-based film was archival quality material in that it was comparatively durable even under frequent use, but it had a coating that clouded the images and was unusable in the microfilm access devices (MAD) employed in subsequent operations. The diazo microfilm did not have this surface coating, and could be used in the MAD equipment, but lacked the long-term durability of the silver-based film.

<sup>7</sup>A "data-defined person" was one whose corresponding "person column" on pages 2 or 3 of the census report form had at least two answered questions.

form did not equal the number of DDP's on the sample pages of the questionnaire. Because folds or creases in questionnaires sometimes created shadows when the forms were filmed, and the shadows sometimes created the impression (as read by FOSDIC) that data existed for nonexistent people, the "S" flag was sometimes set incorrectly. It also was set incorrectly when the camera filmed folds or creases on blank pages, or because data preparation clerks had not properly applied black tape on the last completed person-page of a long form.

When the computer read more than one FOSDIC image for a questionnaire ID in a given CU, the diary flag "\*\*\*\*" appeared. This indicated that the ID corresponded to both a full and a continuation form, or that a camera stutter had occurred.

If the questionnaire failed any one of the coverage or content edits, the diary listed, in addition to the applicable flags described above, the number of every required question missing for that questionnaire on the DCF. These items included those not answered by the respondent and those answered in a way that FOSDIC could not read (e.g., an answer was underlined but its corresponding circle was left blank).

### SPLIT OPERATIONS

Once the electronically captured data from the questionnaires in a CU had undergone the computer edits, the original questionnaires in that CU were transferred from the camera holding area to the split unit. In the split operation, clerks used interactive terminals to wand or key the questionnaire ID numbers on the questionnaires. The ID's were then matched against the edited DCF data. The computer compared the ID numbers against the edited file to determine the questionnaire's status and identified four categories of questionnaires: (1) accepted cases not in post enumeration survey (PES) areas (the accepts), (2) accepted cases in PES areas (the PES accepts), (3) markups, and (4) repairs.<sup>8</sup>

### Split Review

The split review usually involved four consecutive "passes" by the computer, in which the split clerks wanded or keyed the questionnaires in the assigned CU, which separated (split) the forms into the above-mentioned four categories. Before the first pass, all the questionnaires were removed from the CU box and placed in a pile in front of the clerk; the forms were then wanded or keyed. The computer identified those questionnaires in the largest edit category (usually the accepts), which the clerks set aside to the left of their working pile. Those forms belonging to all the remaining edit categories were set aside in one pile to the right. After

<sup>8</sup>The Kansas City PO did not serve any type 1 areas, hence it did not "markups" and had to perform only three "passes" in its split operation.

completing the first pass, the clerk would set the questionnaires from the left pile aside; the pile to the right then became the working pile, and the procedure was repeated for each remaining edit category.

The second pass split out the next largest group, and the third pass separated the third largest group from the smallest. In the final pass, the questionnaires from the last group were wanded or keyed into the computer before they were set aside. A large majority of camera units contained questionnaires for all four edit categories; however, some CU's contained three or fewer categories, so the split review did not always require four passes.

After the last pass for each CU, a message displayed on the terminal screen notified the split clerk whether the CU had passed or failed the system tolerance check on the split operation; if the CU failed the check, the clerk had to put all the piles back together and redo the entire CU. If the CU passed the check, the clerk put each pile into an open box designated for that edit category. When the box for a given category was full, it was closed and sent on to the appropriate unit.

Once through split, questionnaires were sent on one of four routes:

- (1) The accepts went to the Questionnaire Library for either storage (for short forms) or keying (for long forms).
- (2) PES accepts were sent to fullname keying.
- (3) Forms that failed the computer edit due to content or coverage errors were routed to the markup unit. (Only type 1 questionnaires were sent to markup.)
- (4) Forms failing due to machine errors, count inconsistencies, or content edit failures not eligible for markup were sent to the repair unit.

After markup, those questionnaires not requiring telephone followup were recycled through the camera preparation unit. After repair, all forms were returned to camera preparation.

The split operation ran from the last week of March to the end of December 1990. A backlog of cases in late June and early July, particularly in Kansas City, Baltimore, and San Diego, threatened to delay the progress of the PES keying operation, but the work schedules were modified to permit greater processing time and the problem was eliminated before it became acute. Clerks performed the split operation on a total of 122.9 million questionnaires.

During the split operation, the computer automatically printed out a "split profile" after completing each CU, showing the number of times the CU had been reset and split, the status of the split (i.e., pass or fail), the total number of questionnaires in the CU and the expected number by category, and the actual number of questionnaire ID's entered in the split pass. The system automatically identified critical or noncritical errors and printed the number of each on the profile.

Overall, the error rate for the split operation was 0.3 percent. Of all the questionnaires, 99.3 percent were split correctly, 0.3 percent incorrectly, and the remaining 0.4

percent were missing (i.e., "expected" by the computer, but not wanded or keyed in the split). Errors were classified as either critical or noncritical according to whether the error could be corrected at a later point in processing. For example, if a markup questionnaire was mistakenly put in the "accept" pile, this was a critical error, because the form would have proceeded to the Questionnaire Library instead of being recycled through the filming process, and thus the problems with that questionnaire would not have been corrected. If, on the other hand, a questionnaire that should have been put in the "accept" pile was actually put in the "markup" pile, this was a noncritical error because that questionnaire's being refilmed would yield no adverse effect. The table shows the possible error cases in the split operation (C=critical; NC=noncritical):

| Questionnaire was supposed to be in pile— | Questionnaire placed in pile— |     |        |        |
|---|-------------------------------|-----|--------|--------|
|   | Accept                        | PES | Markup | Repair |
| Accept.....                               |                               | NC  | NC     | NC     |
| PES.....                                  | C                             |     | NC     | NC     |
| Markup.....                               | C                             | C   |        | NC     |
| Repair.....                               | C                             | C   | NC     |        |

The most frequent error in the split operation was the misplacement of questionnaires that should have gone to repair in the "accept" pile (a critical error). The most frequent type of noncritical error was the misplacement of "accept" questionnaires in the "repair" pile.

## Markup

The markup unit received questionnaires from only type 1 DO's that failed because of either coverage or content errors. When the number of people listed on the form was inconsistent, this constituted a coverage error. A content error occurred when a respondent did not answer a specified number of required questions. The computer edits identified these errors, and the split operation generated markup diaries that identified which questionnaires had which problems. Markup clerks used these diaries to locate the errors on the forms and then either corrected the errors themselves or marked the forms for telephone followup.

Next to each questionnaire ID, the markup diary listed the flags (notations that designated the error type) for each coverage error. Coverage errors included the "item A" inconsistency error, when the number of people enumerated on the questionnaire could not be determined because the number of DDP's did not equal the value entered in item A of the "For Census Use" box. Other coverage errors occurred when the respondent gave a "yes" answer to question H1a or H1b, indicating he or she was unsure about how many people to report on the questionnaire, and when the address written for question 1b differed from that shown on the questionnaire label, indicating the people shown on the questionnaire should be enumerated at a different address.

Markup clerks consulted the diary printout and reviewed the questionnaires in their assigned CU. Their job was to correct and mark up each questionnaire such that it could be returned to camera preparation for recycling or, if not completely corrected, be ready for telephone followup. For each form, they corrected the errors they were allowed to correct, crossing off the corresponding flag letter or item number on the diary. For those errors that could not be corrected without contacting the household, the clerks wrote the flag(s) and/or question number(s) in purple (indicating failed edit) above the appropriate person column, or circled the questionnaire numbers on the remaining page. If clerks could correct all errors on a questionnaire, they placed it in a folder marked for return to camera preparation; otherwise, they sent it to telephone followup.

Markup clerks checked their procedures manuals to determine which questions they could correct and which ones they had to leave for followup. For example, if a write-in answer was given when a FOSDIC circle should have been filled in, the clerk pencilled in the appropriate circle—so if the respondent had written “stepson” in the answer space for question P2 (relationship) but had not marked any circle, the clerk was supposed to fill in the “stepson/stepdaughter” circle. For question P4 (race), however, no action was to be taken on write-in responses; this job fell to the race keying unit. Clerks were instructed not to attempt to derive either age or year of birth by subtraction for replies to question P5. If more than one circle was filled in and the correct answer was obvious, the clerk erased the incorrect mark. (This did not apply to item P17b (military service), the only question for which more than one answer could be acceptable.) For instance, if the respondent marked both “bachelor’s degree” and “professional school degree” for question P12 (highest education completed), the clerk was instructed to accept the highest level answered and erased or covered up with a white correction dot the “bachelor’s degree” response.

In addition to the question item content errors, markup clerks were responsible for reviewing the diary coverage flags mentioned above. For the item A inconsistency flag, clerks checked that the FOSDIC circles for item A matched the handwritten entry and that this number agreed with the number of DDP’s. If so, they crossed off the flag and sent the form (if there were no other errors) back to camera preparation as a recycle; but if the recalculated number did not match the item A entry, they marked the form with an “A” in purple pencil and sent it to telephone followup. Clerks checked questionnaires with other flags in a similar fashion, either correcting the error or marking the form for followup.

The QA plan for the markup operation involved QA clerks’ taking a 5-percent sample of questionnaires from each WU and independently verifying the markup work. They identified two sets of errors for this operation: omission errors, or actions that markup clerks failed to follow, and incorrect actions, actions that clerks performed erroneously. For the whole operation, the overall error rate was

1.3 percent (2.2 percent for short forms and 1.0 percent for long forms); of the total number of errors, omission errors constituted 68.5 percent and incorrect actions, 31.5 percent.

The markup operation lasted from the third week of March through the first week of October 1990, and took place in all of the PO’s except Kansas City (the KCPO did not service any type 1 areas). Markup experienced a backlog of questionnaires in mid-to-late May that slowed the progress of the telephone followup operation; to help alleviate this delay, the PO’s allocated the workload among themselves. In all, markup clerks processed 27.1 million questionnaires (8.7 million short and 18.4 million long forms).

## Repair

The split operation sent questionnaires that failed computer edit for mechanical, ID-number errors, or failures not eligible for markup to the repair unit, where clerks handled forms with count inconsistencies, FOSDIC misreads, questionnaire ID number problems, and age problems. Repair reviewed all edit failures that could not be sent to telephone followup. Like markup, the repair operation employed a computer-generated diary to identify which questionnaires had which problems.

The repair diary listed, for each questionnaire ID, the flag denoting the error for that questionnaire. There were five possible repair flags: “M,” for machine-related problems; “X,” for missing or invalid ID numbers; “XP,” for questionnaires that did not belong in the PO where they were being processed; “A,” for discrepancies between item A value and number of DDP’s; and “G,” for age/year-of-birth write-ins present but for which the FOSDIC circles had not been filled. Of the more than 22,000 questionnaires erroneously handled in the repair operation (2.1 percent of its workload), the largest percentage (42.8 percent) were “A” flags.

Repair clerks attempted, where possible, to correct the errors on the questionnaires and then send them back to camera preparation as recycles. For “M” flags, clerks examined the form and fixed (with transparent tape) minor damage such as slight tears or long-form pages separated from their covers. More serious physical problems with the questionnaire, such as crumpled pages, obliterated index marks, and stains, required that the information be transcribed on a fresh questionnaire. For “X”/“XP” and “G” flags, clerks checked that the circles for ID and age, respectively, were filled in accurately; if not, they marked in the correct information. “A” flags required the clerks to verify the person count in item A of the “For Census Use” box. If a clerk could not resolve a problem with a questionnaire, he or she referred it to a supervisor for decision.

The QA procedure for repair required taking a 1-in-20 sample of short forms and 1-in-10 sample of long forms from each completed WU. QA clerks checked the repair clerks’ work and fixed any mistakes. Of the more than

884,000 forms (approximately 646,000 short and 238,000 long forms) handled by repair in the 7 PO's, there was an estimated 2.5-percent error rate (2.4 percent for short forms; 3.0 percent for long forms). During a few weeks, in three PO's (Baltimore, Austin, and Albany), QA clerks mistakenly entered their verifier ID number in the space for total number of items verified; this may have affected overall error rates for the operation.

The repair operation lasted from March 26 to December 27, 1990. Estimated error rates for repair clerks fell steadily over the 40 weeks the operation took place, but error rates did increase for both short forms and long forms from weeks 5 to 15 (May and June). This increase may have been due to the use of temporary clerks from other operations in repair to help reduce backlogs in this period. In addition, repair clerks were moved to assist in other operations that encountered backlogs. Because test decks for qualification for repair were not prepared in time for use in qualifying clerks, there was a late shift to "live" WU's; this may have exacerbated backlogs in the operation.

## TELEPHONE OPERATIONS

### Telephone Followup

Most questionnaires from markup (96 percent) were sent to the telephone followup unit, where telephone followup enumerators used the notations made by the markup clerks to know what questions to ask respondents. For questionnaires that did not have phone numbers provided, telephone number lookup clerks attempted, using phone books and directory assistance, to obtain a number at which respondents could be reached. Then telephone followup enumerators made up to five attempts, at various times of day, to contact respondents. If a respondent could not be reached, the questionnaire was assigned to the appropriate DO for an enumerator visit.

The telephone followup operation began April 2 and was scheduled to last 24 weeks, through September 17. Backlogs in markup and telephone followup occurred in all PO's. As many as 65,000 enumerator long forms were not correctly routed to telephone followup in the Albany PO, and this problem was not resolved until September 28. Because of backlogs in the operation in May and June, first priority was given to ensuring that at least one call was made for every case, and second priority to questionnaires with coverage-edit failures; after mid-June, most questionnaires with content-edit failures that were unresolved by telephone were not sent to field followup. Furthermore, the number of required attempts for each case was reduced from five to three in the beginning of June. These procedural changes were made to get the maximum benefit from telephone followup while minimizing personal visits by enumerators.

When they reached a suitable respondent (a knowledgeable household member at least 15 years old who lived at

that address on Census Day<sup>9</sup>), telephone followup clerks asked the respondent to confirm that the list of names on the questionnaire was a complete and accurate record of the people living at that address on Census Day. If there were people missing from the questionnaire, clerks took their names, asked the population questions for them, and updated the value in item A to reflect the total number of people in the household. When following up questionnaires that failed edit, if someone was listed who should not have been, clerks canceled the appropriate person column on the form by crossing out the name and filling in the two cancellation circles at the bottom of the column.

Clerks then attempted to resolve all unanswered questions and unsettled diary flags (indicated by the purple notations markup clerks made on the questionnaire). For instance, if an "A" was written at the top of page 1 (for an unresolved item A inconsistency), clerks had to verify with the respondent the proper number of people in the household and then correct the questionnaire accordingly. If respondents were hesitant, distrustful, or irate, clerks attempted to reassure them that their answers were confidential by law.

After successful contact, or five unsuccessful attempts, the telephone clerks sorted the questionnaires into two groups—recycles and personal visit followup cases. The recycles consisted of all questionnaires that had been completely or partially repaired by respondent contact or refusal, and all enumerator returns. The telephone unit referred these cases to the camera preparation unit for recycling through the data capture system. Personal-visit followup cases included *only* type 1 DO mail returns: which had no telephone number, or for which the telephone clerk had contacted the wrong respondent, or for which there had been no contact after five attempts. All of these cases were sent to the personal visit followup check-out unit for referral to the appropriate DO, which then had the responsibility for field followup (see ch. 6). Type 1 enumerator returns which failed edit and were not successfully contacted by the telephone followup unit could not be sent to the personal visit check-out unit for return to the DO's. These questionnaires were recycled, as is, through data capture.

To ensure that the followup procedures were being carried out correctly, QA clerks listened to a sample of the telephone clerks' calls. They graded the clerks, on a scale from poor to excellent, on whether they used the proper introduction, whether they asked the questions properly (and probed when necessary), and their quality of speech. In the seven PO's combined, monitoring clerks issued 3.9 percent below-satisfactory ratings and 78.8 percent above-satisfactory ratings; of the below-satisfactory marks, the category of proper introduction accounted for 44.4 percent.

<sup>9</sup>Asking census questions of someone who was not a household member, such as a friend, neighbor, babysitter, or relative who did not live in that housing unit, violated the confidentiality provisions of Title 13.

For any below-satisfactory marks, monitors were supposed to enter comments explaining the problem; in these cases, supervisors gave appropriate feedback to the telephone clerks. One problem with the monitoring plan was that QA desks were often within view of the followup clerks being monitored. Furthermore, rating averages varied somewhat from PO to PO due to the subjective nature of the grading procedure. Another problem was a shortage of monitors in several PO's. Because the PO's encountered backlogs in the telephone followup operation, clerks who would have been assigned to monitoring duty were instead assigned to phone stations to help handle the higher-than-expected workload. In every PO, the average number of calls monitored per clerk was fewer than the four specified by the QA plan; rates ranged from 1.67 (Baltimore) to 3.81 (San Diego).

A separate QA procedure determined whether a clerk had an abnormally high or low rate of unresolved actions or respondent refusals. In this operation, QA clerks took a sample of forms from the followup clerks' "data obtained" folder, which contained questionnaires on which the clerk had resolved all edit items marked or for which the respondent answered only a few questions and then refused to proceed with the interview. Overall, 3.8 percent of all edit actions were unresolved and 2.4 percent were refusals. The income question (P32) was the population item most frequently unresolved and most frequently refused. Of the housing questions, H22 (annual payment for fire, hazard, and flood insurance) was most frequently unresolved, and H6 (property value), H7 (monthly rent), and H20 (annual utility and fuel costs) were the ones most frequently refused.

### Questionnaire Assistance

As in earlier decennial censuses, a large number of people in 1990 requested assistance in completing the questionnaire. The PO's and DO's began receiving telephone calls of this nature soon after the mailing of census forms in March 1990. The Bureau had established toll-free (800) telephone numbers for eight different languages: English, Spanish, Chinese, Cambodian, Vietnamese, Korean, Laotian, and Thai). All PO's (except Kansas City, which did not perform this operation because it serviced no type 1 DO's) provided telephone assistance in English and Spanish, but sole responsibility for the six Asian languages fell to the San Diego PO.

Of the approximately 2.5 million assistance calls received in the operation, 41 percent of the callers reported that they had not received a census form. Because the number of requests for census questionnaires was considerably higher than expected, the Bureau modified its procedures in mid-April. Prior to April 12, assistance clerks asked these respondents whether they routinely got mail, but simply had not received the questionnaire. If the caller usually received his or her mail, the clerk addressed a form D-2640

envelope for mailing a D-18L form letter and gave it to his or her supervisor and told the caller that a census enumerator would visit the area later to complete a questionnaire. If, on the other hand, the caller indicated a history of problems with mail delivery, the clerk took the census information over the telephone, writing it on a Form D-25, *Were You Counted?*, and gave that to his or her supervisor. The addresses obtained by telephone were referred to the search/match Unit for a match to the ACF. If the address was located, the D-18L letter was sent informing the respondent that an enumerator would be coming to collect the census information. If no record could be found in the ACF, a questionnaire was sent to the address. In order to reduce nonresponse followup costs, the Bureau decided—starting April 12—to send a questionnaire to each caller who requested one (rather than just the letter), with instructions to fill out the form and hold it until an enumerator picked it up.

In addition to the "no form received" calls, telephone assistance clerks answered a variety of questions regarding such concerns as the mandatory nature of the census, the confidentiality of responses, and the difference between the long and the short forms, as well as specific questionnaire items. In a sample of the approximately 1.4 million calls that did not request a census questionnaire, 23.3 percent pertained to population items (particularly P1, name, P4, race, and P32, income) and 13.4 percent to housing items (particularly H6, property value, and H7, monthly rent). Many callers had general questions or problems with the census: e.g., two forms received (9.4 percent), Spanish-language questionnaire needed (8.6 percent), questionnaire lost (7.3 percent), enumerator assistance wanted (2.1 percent), and complaint that the census was an invasion of privacy (1.5 percent). Clerks consulted their manuals for the appropriate answers to these and other inquiries. If a caller asked whether census jobs were still available, the clerk gave the address and phone number for the recruiting office at the appropriate PO. When callers asked if they could give their answers over the phone, assistance clerks encouraged them to complete the form on their own. If a caller insisted on giving the information, the clerk referred the call to a supervisor, who conducted a telephone interview.

The telephone assistance operation began March 7 and lasted through April 15. The PO's ran two shifts daily, 7 days a week. Even so, the number of calls for assistance received in the opening days of the enumeration was much higher than projected, as was the proportion of calls to the Spanish-language 800 number (about 30 percent of all calls), and the Bureau decided it had to significantly expand the telephone assistance operation to handle the workload in the time available. Telephone lines and clerks were added as quickly as the equipment could be installed and clerks trained or transferred from other work. By early April, the number of telephone lines devoted to the assistance operation had nearly tripled. The initial and peak

number of telephone lines allocated to the telephone assistance staff in each of the PO's involved were as follows:

| Processing office            | Telephone lines    |                 |
|------------------------------|--------------------|-----------------|
|                              | Initial allocation | Peak allocation |
| Total <sup>1</sup> .....     | 318                | 903             |
| Albany .....                 | 77                 | 120             |
| Austin .....                 | 38                 | 127             |
| Baltimore .....              | 60                 | 202             |
| Jacksonville .....           | 35                 | 112             |
| Jeffersonville .....         | 67                 | 181             |
| San Diego <sup>2</sup> ..... | 41                 | 161             |

<sup>1</sup>The Kansas City PO did not participate in telephone assistance because it did not service type 1 DO's.

<sup>2</sup>In addition to the standard assistance lines, the San Diego PO also had 45 lines devoted to providing assistance in six Asian languages: Chinese (12 lines), Vietnamese (11), Korean (8), Laotian (5), Cambodian (5), and Thai (4).

In addition, Spanish-language forms were available in the walk-in assistance centers at many of the DO's so that respondents could trade in their English-language form rather than have to request a Spanish form by phone. (People who wanted to exchange an English-language for a Spanish-language form had to bring their English one so that the unique ACF code could be copied onto the new questionnaire; otherwise the form could not be processed.)

The high number of calls also affected the QA procedure for telephone assistance. Many clerks originally assigned to monitoring duty were moved to phone duty to help handle the volume of calls. As a result, none of the PO's was able to monitor the four calls per clerk as specified by the QA plan. Although no hard data are available, the actual number of calls monitored was probably less than four, but more than two.

Like the telephone followup QA plan, the telephone assistance QA procedure judged clerks on three characteristics: proper introduction, questions answered properly, and quality of speech. The first two categories each accounted for about 38 percent of the below-satisfactory ratings. Overall, approximately 88.8 percent of the ratings were above satisfactory and 2.2 percent below satisfactory.

## DATA KEYING

All PES long and short forms, and all non-PES long forms accepted during the split operation (see p. 10), were grouped into batches by CU.<sup>10</sup> The batches of questionnaires, as well as microfilm of report forms with write-in responses to the race item, were sent to the data entry unit for keying. The unit carried out three separate data entry operations—full name keying, sample write-in (long form) keying, and 100-percent race keying. The full name and

sample write-in (long form) keying actually were combined for the long forms, while a second subunit handled the 100-percent race keying for written responses to the race item from the short forms.

PES "accept" questionnaires had priority and were keyed first. Long-form non-PES questionnaires went to a temporary holding area in the Census Library to await write-in keying (these questionnaires did not go through full-name keying). Once moved to the keying unit, the materials were checked in on the bin-tracking system (BTS), and assigned to the appropriate subunit (full name or sample write-in keying) for data entry. After data entry was completed, the questionnaires were checked out of the keying operation on the CATS and the rolling bins on the BTS, and the bins were sent to the PES or the regular Questionnaire Library.

## Controls

The split unit routed boxes of PES questionnaires to the keying unit, while boxes of non-PES long forms arrived from the long-form holding area. Boxes arrived in rolling bins, and the control clerk of each keying unit checked each bin in and out of the unit on the BTS, and each CU was checked out of the unit on the CATS.

Rolling bins arrived at the unit containing up to 48 CU's, each bin containing boxes of only one type (i.e., either non-PES long forms or PES "accepts" long or short forms), with a Form D-1802, Incoming Transmittals, sheet attached. The D-1802 showed the originating unit for the CU's, the destination (i.e., full-name/long-form keying, 100-percent race keying), a transmittal identification number, and the number and type of CU's in the bin. The clerk verified the information on the form and then checked the bin into the BTS, entering the bin ID number and the total number of CU's in the bin. The control system automatically checked the ID number against a list of acceptable bin numbers for the unit and the total number of CU's against the record from the dispatching unit of the number in the bin when it was sent to the receiving unit. If there was a discrepancy, the BTS terminal displayed an "alert" message for the clerk, who notified the unit supervisor and the WMU to resolve the problem. When the BTS found no problem with the CU's being checked into the unit, it flashed an "accept" message and accepted the bin into the unit. The clerk removed the white copy of the D-1802 and placed it in the "Incoming D-1802" folder and sent the bin to the holding area.

For outgoing bins, the control clerk filled out a form D-1802 with the appropriate information (see above), verified the contents of the bin, pulled the pink copy from the D1802 and placed it in the "Outgoing D-1802" folder, checked the bin out of the unit on the BTS (entering the bin ID number, an alphabetic line code representing the correct outgoing code of the bin, and the total number of CU's), and notified the WMU to have the bin (or bins) moved to the appropriate library.

All CU's, or boxes, that completed keying were checked out of the keying unit on the CATS. As each batch

<sup>10</sup>A batch of long forms could vary from 1 to 400 questionnaires, while a short-form batch could have from 1 to 1,800 questionnaires.



completed keying, it was placed in bins for CATS registration. The CATS control clerk registered the bins and CU's on the CATS, entering a control-user ID at the CATS terminal to identify the particular type of CU (e.g., 0501 for PES keying, and 0502 for non-PES CU's). After entering the appropriate control ID number, the clerk keyed the CUID for the specific batch; the CATS then displayed a screen prompt "Ready to Check Out Camera Unit 9-075400-6-3", and the clerk pressed the "do" key to complete the check-out process within the CATS. Once all the batches in a bin had been checked out on the CATS, the bin was moved to the temporary staging area to await check-out on the BTS (see above).

### Full Name/Long Form Keying

Assignment clerks in the keying unit moved checked-in bins of forms from the temporary staging area to the keying units and assigned individual boxes (CU's) of forms to specific keyers for data entry or verification. The clerk maintained a Form D-2673, Assignment Log, entering specific batch assignments made to each keyer. No more than one batch was assigned to a single keyer at a time, and keyers could not verify batches they had processed. After data entry, the keyers returned the batches to the assignment clerk, who moved them temporarily to a staging area before QA verification. The clerk checked the CATS program for the QA sample "start with" and "take every" numbers for each batch to select forms for verification (thus in a batch with a "start with" number of 5 and a "take every" number of 15, the QA sample consisted of the fifth report form, and every 15th report form thereafter) and assigned the batches to qualified keyers for verification. Batches accepted after verification were sent to another temporary staging area pending dispatch to the Questionnaire Library; rejected batches were recycled through a repair and verification operation until they were accepted.

Each data keyer received batches (i.e., CU's of questionnaires) from the unit assignment clerk. The keyer entered the nine-digit batch/CUID number (including the "P" suffix for PES batches and the numerical suffix for non-PES batches), and the questionnaire identification information—the identification number at the bottom of the "person column" on page 2, "item A" (total number of people listed), and "item B" (type of unit; a letter representing the filled-in FOSDIC circle indicating whether the questionnaire was a regular form, a continuation form, the household's usual residence was elsewhere, etc.). The keying program automatically determined the type of questionnaire from the identification information and displayed the appropriate keying screens, in order, needed to obtain all the required data. For example, if the keyer entered a PES long-form questionnaire identification number, the system displayed first the 100-percent people write-ins keying screen, followed by the sample housing screen, and the PES telephone number keying screen. Each "screen" prompted the keyer to enter each required data item in succession. (Special written instructions for keying income

data covered such situations as reported income loss, dollar range reported instead of a specific amount, "K" or "M" entered after a dollar amount (e.g., "\$39 K" or "\$1.3 M," and so on.)

Each keyer worked through the assigned batch, entering the required data from each form until the entire batch was completed. When a keyer had to leave the terminal for a lengthy period before completing a batch, he or she suspended keying the batch—after the completion of any questionnaire in it—by pressing the "menu" key and selecting the "suspend batch" menu. This suspended the batch and the screen displayed the census data entry control menu. When returning to a suspended batch, the keyer selected the "keying" menu item from the control menu, entered the nine-digit batch ID; the system returned to the suspend point, and the keying could be resumed.

After all the required data from all questionnaires in a batch had been entered into the file, the keyer selected the "batch finished—exit" menu item and the computer checked the total number of questionnaires keyed against the total number shown in the batch record; if they matched, the batch was accepted, and the keyer returned it to the assignment clerk and picked up another for processing. If the batch failed this check, the keyer reentered the batch ID number and searched for any missing questionnaires by comparing the screen entries to the questionnaire ID entries. Any missing questionnaire's data were inserted and the batch rechecked; this process was repeated until the batch was accepted.

### 100-Percent Race Keying

The 100-percent race keying operation entered write-in responses to the race item on the census report forms. All the 100-percent race keying originally was to be done at the Baltimore PO, but staffing and organizational problems compelled the Bureau to disperse the keying operation to all seven processing offices, each of which handled the keying of forms from its own processing area.<sup>1</sup> A total of approximately 3.8 million report forms were involved in this part of the data keying operation.

The 100-percent race keying unit used the microfilm access device (MAD) equipment to enter data from the race item. Each MAD used by the unit was connected directly to the DEC<sup>11</sup> network and was controlled by a computerized data entry program using FOSDIC data files to identify which records included write-in entries for the race item and to display the appropriate information for data keying.

Within the PO's, materials required for the 100-percent race keying operation were monitored and controlled by the WMU using the CATS. Each PO's Film Library sent carts of microfilm for 100-percent race keying to the data entry unit for processing on request. The individual boxes containing microfilm requiring this keying had preprinted labels with a red "RW" (for "race write-in" microfilm without

<sup>11</sup>Trade name for Digital Equipment Corporation products.



race data written in were labeled with a blue "PO"). The control clerk at each unit checked the form D-1802 attached to each cart to make certain the materials listed were actually in the cart, then moved the cart to a staging area to await a request from the assignment clerk for microfilm. Carts were routed for assignment on a first-in, first-out (FIFO) basis.

The race keying unit assignment clerk assigned batches of from 8 to 30 boxes (rolls) of microfilm to keyers for data entry (generally assigning larger batches at the beginning of a shift and smaller ones towards the end of the shift to evenly distribute the workload), attaching a Form D-2654, Operations Flow Label, to the back of each box. Once the keyer completed data entry for the batch (a roll of microfilm might contain only a few race write-in entries, or might have several hundred), the assignment clerk collected the microfilm, checked to make certain the keyer had filled in the appropriate line of the operations flow label with his or her name and the date the information was keyed, placed the keyed microfilm in the unit's sampling/check-out staging area, and assigned the next work unit to the keyer.

The race keying unit used the MAD equipment to find and display the questionnaire images containing the written responses to the race question—item P4. The DEC processing programs controlled both the display of the appropriate questionnaire on the MAD screen and the data entry screen on the DEC computer terminal used by the keyer. The program prompted the MAD to present specific frames of the microfilm containing questionnaires that had been selected for race keying.

The keyer checked the microfilm CUID on each reel in the batch assigned against the individual box labels. The MAD equipment employed special 16m microfilm sleeves; before loading a reel into the machine, the keyer snapped it into the sleeve, made certain the leading edge of the film wound from the top of the reel down, and inserted the reel into the machine. The MAD automatically threaded the microfilm for reading, and the keyer pressed the return key as many times as necessary until the first user prompt message appeared. The prompt requested that the user name be entered and then the password used by the individual keyer, after which the main menu appeared on the display terminal. The keyer selected "keying" from the menu and entered the eight-digit ID number from the microfilm box label. The MAD scanned the film reel and displayed the first breaker sheet and "asked" whether the film box ID number agreed with the CUID. A "yes" response prompted the MAD to scan the microfilm for the first FOSDIC-selected frame (i.e., the first frame that included a race write-in that required keying, and the keyer entered the last four-digits of the questionnaire ID number shown in the frame (either written in the "For Census Use Only" box on p. 3, section G; or preprinted ID's at the bottom of p. 2). Entering the questionnaire number prompted the program to display the first data field containing a hand-written race entry, and the operator proceeded to key the entry within prompted fields.

The keyer deciphered entries as closely as possible (miskeying could result in verification failure) and recorded any particularly difficult or indecipherable entries on a Form D-2114, Race Keying Verification Record (to enable the verifier to understand what had been keyed). As in other data keying operations, all the prompted race fields were "must key," and the keyer entered a "+" character for any prompted race field that was blank or had been crossed out with no handwritten correction made. Pressing the return key transmitted the entry to the data file and returned the cursor to the first write-in field for the frame, so the entries could be checked. After completing data entry for an individual roll of microfilm, the keyer wrote his or her name, MAD station number, and the data on the D-2654 flow label on the film box, and set it aside until the entire batch was completed. Assignment clerks collected the completed batches, assigned further work on a flow basis, and moved the keyed microfilm to the sampling/check-out staging area to await verification sample selection and check out.

### Quality Assurance (QA)

The purposes of the QA plan for the data entry operations were to detect and correct keying errors and to obtain information on the number and kinds of keying errors being made, in order to control and eliminate the problem procedures or retrain personnel as needed. Every data keyer's work was subject to verification, and no keyer could verify his or her own work. The results of the verification process provided the basic information for the QA plan.

The computerized keying and verification systems at each PO generated a series of daily and weekly production and error reports for use by the QA staff in evaluating and correcting problems in the keying operation. Only one error was charged per field, regardless of the number of key-strokes in any field. The system identified the following specific errors in data entry:

*Field error.* A data field was miskeyed, omitted, or in a duplicated record.

*Key verified error.* The original keyed content of a numeric field did not match verified contents of the field, or the original field was omitted but was keyed by the verifier.

*Sightex<sup>12</sup>/key verified error.* The difference between the original keyed and verified versions of an alpha or alpha/numeric field exceeded established tolerance levels. QA supervisors met with the entire keying and verification staff weekly to identify and resolve problems detected during each week's operations.

Full-name/long-form verification required that a 6.67-percent sample (1 in 15) of every work unit containing more than 30 report forms, or 2 records from every work unit containing fewer than 30 forms, be verified by a clerk other than the original keyer (no keyer verified his or her own

<sup>12</sup>Trade name for a coding system that assigned numeric codes based on the phonetic sound of a surname.

work). The subunit assignment clerk recorded each batch assignment on a Form D-2673, Assignment Log Sheet, and gave the batch to the keyer for verification.

After receiving a batch for verification, the keyer checked the "start with" and "take every" number in the WU box on the batch label, removed the report forms designated for verification, and placed them on top of the batch. The verification keyer then entered the keying system, using specific identification codes for PES or non-PES batches, and selected "Long-Form QA" from the data-entry control system menu. Thereafter, the keyer used the sampling number provided by the assignment clerk, keyed the batch CUID number, and proceeded to key all the data as it appeared on each sampled questionnaire. The verification program compared the data originally keyed for the questionnaire selected for verification with the original data entered for the report form. When differences were detected, the terminal "beeped" and displayed an appropriate error message for the keyer. The verifier reviewed the item involved and made any correction needed and proceeded on to the next item for keying.

After keying all of the questionnaires in the batch verification sample, the keyer pressed the menu key again and the program displayed a "Pass," "Fail," or "Re-QA" (the latter for batches submitted for reverification), together with a batch ID number and an error rate for the batch. The keyers returned passed batches to the assignment clerk. The verification system automatically printed a QA difference list, which showed any differences between what the keyer and the verifier keyed, for failed batches. Failed batches were returned to the assignment clerk as well, who gave them to the original keyer for rekeying, as necessary. After this, the batch had to be reverified, using the same procedures as in the first round of verification.

The first 30 batches (CU's) keyed by each clerk doing 100-percent race keying were submitted for verification. A field error rate (see above) of 2.5 percent or less in those first 30 CU's qualified the keyer for sample verification, in which a random 20 percent of CU's keyed were verified; otherwise, the keyer's work was 100-percent verified. The verification operation for race keying was virtually identical to the data-entry procedures, and verifiers used the same MAD equipment to key the race entries from the questionnaire microfilm. The only operational difference was the verifier's selection of "Verification" from the control system menu displayed on the MAD terminal's screen after the insertion of a microfilm roll. After the keyer entered the eight-digit CUID number from the film box label, the MAD advanced the film to the first breaker sheet so the CUID could be checked. Once the keyer confirmed the accuracy of the ID, it automatically advanced the film again and displayed the first questionnaire page with a written entry to the race item. The verifier keyed the response using the same procedures as the original race keyer. If the verifier entered different data in a field than the original keyer had, the system displayed an error message, and the keyer checked to see if the entry was logged on the Form D-2114, Verification Keying Verification Record. If the entry

had been logged, and the verifier agreed with what had been recorded on the D-2114, he or she rekeyed the entry accordingly; otherwise the verifier pressed the "Reset Key" and went on to the next field. Once all the entries for a CU had been keyed, the verifier moved to the next file. The verification program determined whether the CU had passed or failed based on whether keying errors identified were within acceptable limits and displayed the appropriate message. The verifier then placed completed CU's on the end of the MAD station desk to be picked up by the subunit assignment clerk.

## WRITE-IN CODING

Once data entry and keying of the write-in responses was completed at the PO's, the Decennial Operations Division (DOD) at Bureau headquarters compiled three response subfiles, one for each coding operation—Place of birth, migration, and place of work (POB/MIG/POW), general (GEN), and industry and occupation (I&O). Each subfile included responses to the appropriate write-in questions, household and person identification codes, selected demographic characteristics (such as age), and any other information required for coding.

POB/MIG/POW coding was conducted by the Jeffersonville PO and the Charlotte RCC staffs, while the Kansas City PO did all of the I&O coding. General coding was done at Headquarters.

## Place-of-Birth, Migration, and Place-of-Work (POB/MIG/POW) Coding

The POB/MIG/POW coding operation assigned geographical codes to the write-in responses to items 8, 14b, and 22 on the long-form questionnaires. The place-of-birth question (item 8) requested the name of the U.S. State or the foreign country in which each person was born; item 14b (migration) asked where each person lived 5 years before the census, and item 22 (place of work) asked where each person worked "last week." The place of work coding operation also used the employer's name (item 28) if the location information was inadequate for geocoding.

The POB/MIG/POW coding was divided into four separate but related operations: Place of birth coding, migration coding, place of work-place coding (in nonmetropolitan areas without address ranges in the TIGER data base), and place of work-block coding (in metropolitan and other areas having address ranges in the TIGER data base).

To reduce costs and improve accuracy, the GEO automated all four coding operations in an attempt to match each response to one of four coding reference files. Successfully matched records were assigned the appropriate geographic codes. The four reference files included the State and Foreign Country File (SFCF), the Geographic Areas File (GAF), the Workplace File (WF), and the

Address File (AF).<sup>13</sup> Place of birth coding used the SFCF, migration and place of work-place coding used the SFCF and the GAF. Place of work-block responses were first coded using the GAF to determine the city, county, State and metropolitan area of the work location; then the AF and the WF were used to assign census tract and block codes.

The computer coded the majority of responses to the place of birth and migration items, but significant numbers of place of work-block responses had to be coded by clerks. The automated coding rates by type of coding were as follows:

|             | POB        | MIG        | POW-Place | POW-Block  |
|-------------|------------|------------|-----------|------------|
| Responses   | 37,650,494 | 15,281,848 | 5,652,626 | 10,570,777 |
| Coding rate | 97.9%      | 94.8%      | 96.5%     | 50.3%      |

Responses that the automated coding system could not successfully match to the reference files were assigned to clerical coding. A computer program assigned a unique identification code to each response and then all identical responses were grouped into "clusters." The GEO transmitted the files requiring coding to the clerical coding sites at the Jeffersonville PO and the Charlotte, NC regional census center (RCC) on a flow basis from November 1, 1990, to mid-March 1991. The total workload for the POB/MIG/POW computer-assisted clerical coding (CACC) operations were as follows:

|                  | POB     | MIG     | POW-Place | POW-Block |
|------------------|---------|---------|-----------|-----------|
| Total clusters   | 362,895 | 589,313 | 171,896   | 5,097,961 |
| Ave cluster size | 2.2     | 1.3     | 3.1       | 1.1       |

A clerical coding staff (approximately 500 clerks in the Jeffersonville PO and 600 clerks at the Charlotte RCC) were split into two shifts at each site; clerical coding began in November 1990 in JFPO and January 1991 in Charlotte and ended at both sites in June 1991. A computerized control and tracking system (CATS) divided the response files into work units (WU) and assigned one to each clerk; the average WU size varied by type of coding.

The coding clerks used a menu-driven, interactive computer system with a split screen to access the assigned work unit and the appropriate reference files. The clerks reviewed each individual clustered response and used a search function to try to match a reference file entry to that response cluster. When a clerk selected a match for the cluster, the coding program assigned the appropriate geographic location codes. If no match could be found, the clerk referred the case to the referral coding unit. Clusters with inappropriate entries or that were missing critical

information were labeled "uncodable." The clerical production coding rates (clusters per hour) and referral rates (percent referred) are shown below. POW-Place coding was faster than POB and MIG coding because the program was re-written to reduce the amount of CPU required. The POB and MIG coders' production rates were slowed down by the coding system itself.

|                 | POB  | MIG  | POW-Place | POW-Block |
|-----------------|------|------|-----------|-----------|
| Production rate | 53.3 | 56.7 | 89.0      | 46.7      |
| Referral rate   | 7.7  | 19.9 | 13.5      | 57.0      |

The referral clerks had access to additional reference materials not available to the production clerks, including maps, atlases, and geographic dictionaries. Place of Work-Block referral coders also had access to computerized references such as ZIP+4 files, commercial telephone number listings, and computerized block maps. If the referral unit clerks were not able to code a cluster, the responses were labeled "uncodable."

The clerical production coding units employed an automated QA system. The computer automatically selected a small sample of the responses coded by the computer and a larger sample from each response file and duplicated them twice. These duplicated QA cases were interspersed among the other responses and divided into WU's. The CATS system assigned each WU with the same QA response to three different clerks. The three clerks coded their WU, including the replicated cases, independently, and then the computer compared the codes assigned to each QA case. If two clerks coded the QA response with the same codes, that "majority" code was considered correct. The minority code case was evaluated for possible error. In cases where computer-assigned codes differed from clerically assigned codes, the automatic system was considered to be in error, but the machine code was not changed. The QA system did not assign an error when all three clerks assigned different codes to a given case; instead, the computer-assigned code was assigned to the case (if the response was part of the computer-coded universe), or the production clerical code from the WU with the lowest number was assigned as the final code for cases from the clerically coded universe.

Analysis of the QA system results showed that, overall, error rates for the POB/MIG/POW computer-assisted clerical coding operation were not substantially different from those obtained in the 1980 clerical processing. The estimated error rates by operation were as follows:

|                       | POB | MIG | POW-Place | POW-Block |
|-----------------------|-----|-----|-----------|-----------|
| Estimated error rate  | 4.1 | 7.3 | 3.0       | 8.8       |
| 3-way difference rate | 0.8 | 1.7 | 0.5       | 2.5       |

After the staffs at the Jeffersonville and Charlotte coding sites completed all clerical production and referral coding, the Geography Division matched the clerically coded clusters back to the original responses. Once this merge was completed, the coded POB/MIG/POW file was returned to the DOD on a flow basis, and the results merged with the rest of the sample data.

<sup>13</sup>The SFCF contained the names and abbreviations of all States and six statistical-equivalent entities in the United States and outlying areas; names and alternate names, and abbreviations, for foreign countries; selected foreign regional names; and selected foreign city names. The GAF consisted of place and country names, abbreviations, and alternative names in each U.S. State and MCD names in the nine northeastern States. The WF contained names of employers, their locations, and the appropriate geographic location codes. The AF consisted of address ranges and their associated geographic codes for each block side that had structure number/street name address ranges in the TIGER data base.

## General Coding

The general (GEN) coding operation assigned numeric codes to write-in entries for items 2 (relationship), 4 (race), and 7 (Spanish/Hispanic origin) on the short- and long-form questionnaires, and for items 13 (ancestry) and 15b (language) on the long-form questionnaires. The write-in responses to various items were keyed directly from the report forms, and keyers were instructed to "key what you see," that is, to key exactly what the respondent wrote on the questionnaire, without interpreting the response. The computer accumulated the keyed write-in responses to the selected items from the questionnaires, and then extracted six sets of keying files, one each for ancestry, relationship, Spanish/Hispanic origin, and language, and two for race—one for Asian and Pacific Islander responses, and a second for American Indians. These subfiles were sorted alphabetically and then "collapsed" to form a record for each write-in response, with a counter indicating how many times that particular write-in occurred. The unique write-ins were matched to master files of precoded responses from the 1980 census, the 1986 census test, and the 1988 dress rehearsal; records that did not match those in the master file were added, and the new responses coded by subject-matter specialists in the Population Division (POP) at Bureau headquarters, using a computer-assisted coding system. The statistical details of the general coding operation are in the table below.

| Coding operation        | Start date | End date  | No. of coders | Responses assigned | Codes added to master file |
|-------------------------|------------|-----------|---------------|--------------------|----------------------------|
| Ancestry                | Dec. 1990  | May 1991  | 16            | 35,248,408         | 921,251                    |
| 100-percent race        | Aug. 1990  | Dec. 1990 | 7             | 9,882,310          | 236,216                    |
| Language                | Dec. 1990  | May 1991  | 4             | 4,080,609          | 56,863                     |
| Race coding (long form) | Mar. 1991  | Apr. 1991 | 2             | 2,204,746          | 19,451                     |
| Relationship            | Dec. 1990  | May 1991  | 1             | 505,797            | 10,115                     |
| Spanish/Hispanic origin | Dec. 1990  | Mar. 1991 | 2             | 805,943            | 26,539                     |

The basic coding procedures for the general race coding were similar to those used for the POB/MIG/POW computer-assisted coding operation. Each coder used an interactive terminal that displayed portions of the master data file on the coder's computer screen. The coder checked unique write-ins (i.e., responses that did not match, character-by-character, any entry in the master file), and entered the correct code (six digits for the ancestry codes, three for all others). The coders also filled in blank code fields and could also change codes already assigned if they believed them to be inappropriate. Once a particular response was coded, it was automatically added to the master file, and future occurrences would be coded by the computer.

The QA plan for the general coding operation checked each coder's work. All of the first 1,000 codes assigned by each coder were verified by a second coder, usually the coding supervisor. After the first 1,000 codes had been checked, and assuming satisfactory performance, a 5-percent sample of each day's work was verified thereafter. In

addition, when 300 or more cases<sup>14</sup> were coded with the same answer on a given day, all cases with that answer were verified 100 percent. In checking each coder's work, the QA coder verified each assigned code and determined its conformance to the written coding procedures. If the verifier disagreed with the code assigned to a write-in item, the original coder was charged with a "difference," and the reviewer noted this on the QA listing for the coder.<sup>15</sup> A "difference" was not necessarily the same thing as an error, although an error might be involved.

The estimated difference rates for the 1990 general coding operations, compared with the 1980<sup>16</sup> coding, by type, were as follows (the standard error rate for each estimate is in parentheses):

| Item         | 1980 rate   | 1990 rate  |
|--------------|-------------|------------|
| Ancestry     | 4.5 (0.3)   | 1.5 (0.05) |
| Language     | 10.9 (0.9)  | 1.9 (0.3)  |
| Race         | 0.02 (0.01) | 3.9 (0.2)  |
| Relationship | 0.2 (0.04)  | 0.7 (0.4)  |

## Industrial and Occupation (I&O) Coding

Items 28-30 of the long-form questionnaire asked the type of industry (i.e., type of activity at the respondent's place of work), kind of work performed (occupation), and class of worker<sup>17</sup> for every person over the age of 16 who had been employed in the previous 5 years. During processing, the headquarters computer extracted the I&O write-ins from the keyed files and placed them in separate files for computer coding. When the computer was unable, for whatever reason, to assign a certified code to a response, residual (production) coding clerks manually reviewed each rejected case to determine and assign the proper code. A clerical staff of 1,097 at the Kansas City processing office, working two shifts a day, handled the industry & occupation (I&O) coding.

<sup>14</sup>A "case" consisted of the total number of a single response coded by a coder during a specified period—usually a single shift. For example, the ancestry item response "Italian" might be coded by a coder more than once during a shift, but for verification purposes, all of the identical responses would be considered a single "case."

<sup>15</sup>"Differences" were classified as nonsubjective, subjective, and procedural change. A nonsubjective difference occurred when a verifier considered an assigned code to be incorrect, and wrote "NS" next to such cases, with the correct code. A subjective difference was one involving differing interpretation of an unclear response (i.e., "Indian" might be coded as American Indian, South American Indian, or Asian Indian). These differences were marked with "S" on the QA listing. As procedural changes took some time to circulate through the coding staff, verifiers finding problems as a result of procedural changes simply marked the differences and added "PC" to the entry on the QA listing.

<sup>16</sup>The 1980 census involved general coding for 29 population and housing items, and a staff of over 3,000 clerks in the Jeffersonville, Laguna Niguel, and New Orleans processing offices, and required over a year to complete. The difference rates reported for the 1980 census are from an independent coder evaluation in which the majority code produced by three independent coders was compared to the final code for the response.

<sup>17</sup>The question on "class of worker" asked whether the respondent was working for a private for-profit company or individual, a private non-profit company or individual, government (local, State, or Federal), self-employed in own incorporated or unincorporated business, or working without pay in a family business.

The residual coding clerks used interactive computer terminals to review and code assigned cases. The computer system included two automated references specifically for use by the coding staff, the 1990 Alphabetical Index of Industries and Occupations and the 1990 Employer Name Lists. In addition, each clerk had printed copies of the Alphabetical Index of Military Occupations and the Military Specialty Code Occupational Index available for consultation when needed.

Actual coding procedures were similar to those used for the POB/MIG/POW coding, although with different manuals and reference materials. The clerks researched every case, using their procedures manuals, station references, and the automated "lookup" lists to select the appropriate industry and occupation codes. The residual coding clerks also had to verify the "class of worker" (COW) and code that item as well if the COW response did not correspond to the assigned I&O codes, or if the item had been blank.

When neither the computer nor the reviewing clerk could determine the correct code, the reviewing clerk assigned code "997" to the problem case. The computer identified cases coded 997 as referral problem cases and created new work units for transfer to problem-referral clerks. The problem-referral clerks all had completed I&O production training and had 2 weeks or more of production coding experience before being selected (based on coding quality and production rates) for additional training and assignment as referral coders. These coders checked each case to make certain appropriate codes had not been overlooked; if not, they consulted the elaborated coding rules and references provided in the referral procedures to determine the correct ones. Periodically, the referral unit supervisors, or representatives from the Housing and Household Economic Statistics (HHES) Division, reviewed each referral clerk's work to ensure correct procedures.

The same QA system of triple independent clerical coding of selected cases used in the POB/MIG/POW coding operation was employed for the I&O coding operation. Three different coding clerks coded QA sample responses and the results were compared.

## **LIBRARY UNIT**

Each of the seven PO's received approximately 19 million census report forms for processing, which generated thousands of rolls of film. All of these materials had to be stored, protected, and readily accessible to any of the various operational units in the PO. Thus each PO included three libraries, one responsible for storing and accessing microfilm and the other two for census questionnaires. After film duplication, boxes of microfilm sent to the PO's from Jeffersonville were stored sequentially by camera-unit identification (number) (CUID) for easy access for routing to the microfilm accessing unit. Work units of accepted short-form questionnaires arrived from the split unit, and long form accepts from the PES full-name data entry unit and the write-in keying unit. The Census Questionnaire

Library stored the non-PES questionnaires by camera unit; in the PES Library, the census questionnaires were sorted by PES cluster number.

## **Film Library**

The Jeffersonville PO retained the original rolls of FOSDIC microfilm and returned the copies to the originating PO's by air express, where the microfilm was routed to the Film Library, a centralized storage and control area for all microfilm in each PO. Film was stored in 12-drawer microfilm cabinets, each of which contained up to 1,560 film boxes. The drawers were filled from the front to the back, and left to right in numerical sequence. Film was stored in boxes, short and long form by CU number (see above) for easy reference.

**Silver film**—This film was used in the cameras that took pictures of the individual questionnaire pages. PO personnel shot, developed, and scanned this film, which became the archival copy ultimately sent to the National Archives as required by statute (Title 44, U.S. Code). Silver based film had a coating that clouded the images, which made it less desirable for use in the microfilm access devices (MAD; microfilm readers and printers) used during subsequent operations to review filmed copies of the questionnaires. The silver-based microfilm that passed the QA procedures in the film processing unit was loaded onto the FOSDIC scanner, which read the images on the film and converted the information into a format that was readable by computer (see pp. 9-10 for details). After this, the film was moved to the film staging area, where clerks separated the microfilm boxes that required supervisory attention from those that did not. The latter were staged for 3 days to ensure that the data read from the film in the FOSDIC process was uploaded to HQ and backed up. From the film staging area, the box of microfilm was checked out and prepared for shipping to the JFPO for duplication.

**Diazo film**—The DPD in Jeffersonville made two diazo copies of each roll of original silver archival film. Plans originally called for only one roll of microfilm to be stored at each PO, with the BAPO having a library for all film. But with the decentralization of the 100-percent race keying to all PO's, both diazo copies of the film were sent to the originating PO, where they were inspected by library staff and stored in the PO's film library until needed for the microfilm readers. These copies were later forwarded to the DPD, in Jeffersonville, for use in the "age search" unit (the personal census service unit) and subsequent census evaluation operations. The AUPO requested and received two additional copies of film (four in total).

Each library staff had a CATS clerk, who was responsible for controlling the flow of materials in and out of the library and for ensuring that all movements of materials were registered on the CATS system; and library clerks, who stored the rolls of microfilm as they arrived from the FOSDIC unit, filled requests for film, refiled film returned to

the library, and delivered materials to requesting units. The CATS clerk in each library controlled two flows of material—the incoming microfilm from the DPD or being returned by a requesting processing unit, and the outgoing reels requested by other units.

On receipt of film from the DPD, the CATS clerk checked the Form D-1802, Incoming Transmittals Sheet, to verify that everything listed had been received. The clerk visually verified that the CUID number on the face and top of the box matched the number on the film reel and pulled several feet of film from each reel to check the density breaker-sheet frames and to see that the CUID on these frames matched the ones checked previously. Any materials with unmatched CUID's were given to shift supervisors for additional checks. To register acceptable items on the CATS, clerks used laser wands to scan the barcodes on the shipper's box; if the barcode was not scanable, the clerks keyed the CUID number on the top of each box to the CATS file.

Various PO units requested copies of the questionnaires needed from specific film reels by submitting a Form D-1960, Request for Staging and Transmittal Log, with the requesting unit's name, date needed, and the camera unit and frame number of each film reel required, to the film library. When the library received a request, the CATS clerk verified that the request form had the required information, entered the date the request was received, and forwarded it to one of the library clerks to locate the film. When the film reels were ready to be sent to the requesting unit, the CATS clerk selected the file for outgoing material and scanned the barcode label on the top of each box requested (again, when the barcode could not be read for any reason, the clerk could key the identification data directly to the file), entered the date "out" in the appropriate box on the form D-1960, pulled one copy of the form and placed it in the "Active Special Requests (D-1960's)" folder, and sent the material on to the requesting unit.

When processing units returned film to the library, the clerks pulled the appropriate D-1960 copy from the folder, entered the date of return of the film on the form, and filed the form in the "Inactive Special Requests (D-1960)" folder. Selecting the "Into the library" file from the CATS submenu, the clerk checked in the film using the laser wand reader or keying the identification information, as necessary, then sent the film on to the library clerk for refiling.

The major difficulties encountered during film duplication involved the quality of the diazo copies and the ability to read them on the microfilm machines. The film duplication procedures required the operators to splice 10 rolls (camera units) of silver film onto a film reel to make one large pooled roll, duplicate that pooled roll, then separate both the original and copies back into the single camera unit rolls. There was a problem fitting these large pooled rolls onto the duplicating machines, so the operators began to cut off the leader on each silver film roll to reduce the film footage. When the operators broke down the pooled rolls, they spliced on leader film (with clear tape) to meet the

required amount of clear leader. When these rolls of film were loaded into the MAD machines, the sticky residue from the tape caused film jams in these machines. The DOD resolved this problem by directing the operators to stop cutting off the silver leaders and to start pooling nine rolls of film onto reels for duplication. To correct the existing duplicate rolls, the Jeffersonville PO used splicing tabs to affix any additional clear leader. If any problems were reported from the PO's, such as blurred images, the JFPO reduplicated the originals; this ended up involving more than 110,000 camera units.

## Questionnaire Libraries

Each PO operated two questionnaire libraries, one for the PES questionnaires, and one for the general census report forms. The control and maintenance procedures for each "branch" library were similar (for details of the PES processing, see ch. 11). The workflow management unit (WMU) sent rolling bins containing boxes of census questionnaires to the library for shelving and distribution for processing. The library staff filed the boxes in a specific sequence by CUID and stored them on assigned shelving units. Each library included various staging areas, and long-form and short-form storage areas. After receiving and storing the questionnaires, the libraries retrieved and distributed individual or groups of questionnaires upon request from various units within the PO's.

The PO libraries were organized into four major staging areas and the questionnaire shelving area. The staging areas were (1) *Receiving*, an area near the entrance of the unit and the control clerk's computer terminal for holding the rolling bins for check-in of materials; (2) *Ready for storage*, where the checked-in CU boxes could be held for shelving; (3) *Long-form holding*, for long forms that were ready for the long-form keying units but not yet requested; and (4) *Outgoing*, for those boxes that had been requested by long-form keying units and for empty rolling bins. The shelving area was divided into short- and long-form shelving, each appropriately labeled. Boxes of report forms were shelved in CUID sequence, and within CU number by box number (boxes were numbered from 1 to 4).

The WMU delivered rolling bins of short forms to the libraries for permanent storage. Each bin had a Form D-1802, Processing Transmittal Record, attached; this showed the bin number (which matched the number on a metal plate attached directly to the rolling bin), the destination, originating unit, and contents of the bin (e.g., "Short, 5 CU's"). The control clerk verified that the bin contained the type of forms and number of CU's listed on the transmittal record. If the information did not match, the clerk sent the bin back to the WMU for return to the originating unit. If the information was correct, the clerk entered the CU numbers for each CU in the bin, and the number of boxes for each CU, on form D-1802, removed the yellow and white copies of the form, and keyed the CU numbers from it into the CATS at the check-in terminal. The clerk then checked the bin into the bin tracking system



(BTS), which kept track of the location of the rolling bins, by keying the bin number into it, along with the CU numbers for the bin contents. Once the bin and its contents had been registered on both the CATS and the BTS, the clerk entered his or her initials on the form D-1802, sent the yellow copy of the form back to the WMU, and placed the bin in the Ready for Storage staging area for the library clerks to file.

The split unit sent boxes of long forms that had passed edit to the library (via the WMU) and these were held temporarily until requested by the long-form keying unit. Check-in procedures were similar to those used for the short forms, except the bins were registered on the CATS and BTS systems for long-form holding. Once checked in, the bins containing long forms were moved to the temporary holding area assigned and the boxes shelved in CU number sequence.

When the full-name/long-form keying unit requested boxes of questionnaires, the library control clerk instructed the library clerks to take an empty bin to the storage area and fill it with the requested boxes, in CU number sequence. The control clerk then completed a form D-1802, filling in a transmittal number (the bin number), the date, personal identification (of the clerk), destination (i.e., full-name/long-form keying), originating unit (i.e., Questionnaire Library), and contents (each CU number and number of boxes for each CU), attached all copies of the transmittal record to the bin, and notified the WMU that a bin was ready to be sent to another unit. The WMU verified the contents of the bin against the information on the D-1802—the library control clerk had to resolve any problems and correct the form D-1802 if necessary—after which the control clerk removed the pink copy of the transmittal record for filing in the “Outgoing D-1802” folder, and the WMU sent the bin on to its destination.

After keying, the full-name/long-form keying unit returned boxes of questionnaires to the correct library— Census or PES. When the boxes arrived at the library, the control clerk followed the procedures used for handling incoming short forms for permanent storage (see above), entering the appropriate information into the CATS.

The Questionnaire Libraries handled special library requests for materials for QA activities and so forth. The requesting unit submitted a Form D-1925, Library Special Request, asking for specific CU's or boxes of forms, and the libraries forwarded them as needed, keeping track of each request and return with D-1802's and on the CATS.

The purpose of the QA operation in the Questionnaire Libraries was to ensure that the report forms were accurately filed so that they could be located with minimum delay. Each library staff included a QA clerk, whose principal responsibility was a weekly inventory of the entire library. The clerk took this inventory by visually checking from CU to CU on shelves for numerical sequence, looking for any missing CU's, and refiling any out of numerical sequence. When a CU was missing, the clerk checked the CATS for a status listing on the unit, and, when the system showed the CUID involved had not been properly checked

out, the clerk checked any Forms D-1925, Library Special Request, on file in the library. The clerk informed the library supervisor of any CU's that could not be located either in the CATS or on filed special-request forms. Following each inventory, the clerks completed a form D-1981, 1990 Decennial Census Questionnaire Library Inspection Quality Record, with the number of items verified (i.e., the number of CU's inventoried in each library), the number of misfiled CU's, the number of CU's checked out of the library, and the number of CU's that were missing, together with any corrective action taken.

## QUESTIONNAIRE EDITS

To provide the highest possible levels of census coverage and data quality, the Bureau designed and implemented an elaborate system for editing census questionnaires and a process to resolve apparent problems. Editing involved reviewing questionnaires for missed or multiple answers and indications of people who might have been missed, and then accepting or failing questionnaires based on a preset tolerance level for errors. Edit tolerances were the number of failures per person or housing unit that constituted passing or failing a questionnaire. The tolerances differed for short- and long-form questionnaires. (See ch. 14 for further discussion of the items on census questionnaires and the individual item edit tolerances.)

### Content Edits

Content edits included a review of questionnaires for missed answers and/or multiple entries and were designed to improve data quality and reduce questionnaire item nonresponse. In general, the content edit was a partly automated and partly clerical review of all population and housing questions on the questionnaire, checking for appropriate skip patterns, that one and only one FOSDIC circle was filled per question, that there was no write-in entry where none was required, that responses to questions were complete, and so forth.

### Coverage Edits

Coverage edits reviewed questionnaires for potential missing people and involved checking questionnaires for household coverage. The methodology used involved either an automated or clerical inspection of item A (total people), question 1a (household roster), question 1b (whole household usual home elsewhere), question H1a (possible additions to the household roster), and question H1b (possible deletions from the household roster) to identify incomplete or inconsistent information on mail- and enumerator-return questionnaires.

### General Questionnaire Edit Information

Type 1 DO mail-return short- and long-form questionnaires were computer edited and failures reviewed and sent to telephone followup at the PO's. If these forms could



not be resolved there, they were sent back to the appropriate DO for personal-visit followup. For mail returns, the edit operation followed questionnaire check-in, filming, and scanning of the developed film (FOSDIC).

Type 1 DO enumerator returns were checked in and shipped from the DO to the appropriate PO for capture and long-form edit. The enumerator-filled short forms were computer edited, but could only fail the coverage edit for a "whole household usual home elsewhere (WHUHE)." Since these questionnaires were already checked-in at the DO prior to shipping, edit at the PO's took place after filming and scanning of the developed film. Enumerator-return edit failures were sent to the telephone followup unit but were not eligible for personal-visit followup.

Type 2, 2A, and 3 DO mail returns were edited in the DO's, after the questionnaire check-in operation. The forms underwent a clerical edit, and if necessary, telephone followup (see ch. 6). If the household could not be reached then, the questionnaire was assigned to an enumerator for a personal-visit followup.

The edit operation for nonresponse followup (NRFU) enumerator-return long forms took place in the DO directly following the questionnaire check-in operation. The forms underwent a clerical edit, like mail returns, except some coverage edits were not done. Enumerator-return edit failures were sent to the telephone followup unit but were not eligible for personal-visit followup.

The computer edits in the PO's were designed to match as closely as possible the DO clerical edit (see ch. 6). If a questionnaire passed the computer edit, it was accepted and stored in the library. If a questionnaire (excluding mail-return short-forms with only content failures) failed the computer edit, it was sent to the markup unit.<sup>18</sup> The computer-sampled, mail short forms with content-only failures were edited at a 10-percent rate. Those that were sampled went to the markup unit. The overall type 1 DO edit failure rate was 13 percent, with 11 percent of the mail short forms and 49 percent of the long forms failing edit.

Table 2. Characteristics of 1990 District Office Mail Returns

| District office (DO) classification      | Type 1          |  | Type 2 and 2A         | Type 3          |     |
|--|-----------------|--|-----------------------|-----------------|-----|
|  | TAR and prelist |  | TAR, U/L, and prelist | TAR and prelist | L/E |
| Operations                               |                 |  |                       |                 |     |
| Check-in .....                           | PO              |  | DO                    | DO              | N/A |
| Surname keying.....                      | PO              |  | DO                    | DO              | N/A |
| Edit.....                                | Automated in PO |  | Clerical in DO        | Clerical in DO  | N/A |
| Telephone followup.....                  | PO              |  | DO                    | DO              | N/A |
| Failed-edit personal-visit followup..... | Yes             |  | Yes                   | Yes             | N/A |

Source: Manager's Handbook, Form D-506.

<sup>18</sup>The markup unit used diary listings (indicating why the questionnaire failed edit) to review the questionnaires and mark the items to be covered by the telephone followup unit (see ch.6).

Table 3. Characteristics of 1990 District Office Enumerator Returns

| District office (DO) classification      | Type 1          | Type 2 and 2A         | Type 3          |     |
|--|-----------------|-----------------------|-----------------|-----|
|  | TAR and prelist | TAR, U/L, and prelist | TAR and prelist | L/E |
| Operations                               |                 |                       |                 |     |
| Check-in .....                           | DO              | DO                    | DO              | DO  |
| Surname keying.....                      | N/A             | N/A                   | N/A             | N/A |
| Edit.....                                | Automated in PO | Clerical in DO        | Clerical in DO  | No  |
| Telephone followup.....                  | PO              | DO                    | DO              | No  |
| Failed-edit personal-visit followup..... | No              | No                    | No              | No  |

Source: Manager's Handbook, Form D-506.

## CONTROL OF MATERIALS

### Introduction

The control of converting and capturing data from paper questionnaires to computer files, as well as the control and monitoring of materials entering and leaving the processing office, was done through an automated system, referred to as the Data Control System (DCS). The system involved a series of subsystems, each designed to monitor a separate aspect of the processing operation. This section describes the system's features for controlling and tracking materials entering the PO and the physical movement of the materials through the processing elements. Data capture and storage are described in other sections of this chapter.

### Automated Tracking Systems

**Bin tracking system (BTS)**—The BTS was a computer system for controlling the movement of bins of any type of materials (camera units, boxes, trays, film, etc.) from one processing unit to the next. The BTS only tracked the bin and not the contents of the bins, which might have been trays, boxes, or film reels. The purpose of the BTS was to monitor workflow volume and backlogs. Each PO had approximately 500 rolling bins. The BTS allowed users to send and receive bins, view bin and flow information on a computer screen, monitor backlog by flow, and generate production reports by flow. It enabled managers to better schedule and plan. Some examples of the operations monitored by the BTS were open batch, data preparation, markup, telephone followup, and repair.

Each bin was tracked by a five-digit identification number. As the bin arrived in a unit, such as camera preparation, the identification number was entered into the BTS. Nearly every unit in the PO had a BTS checkpoint. When work was completed, the bin was checked out of the unit in a fashion similar to the way it was checked in. Control and workflow management clerks were responsible for keeping the bins moving smoothly through processing. Control clerks monitored the work flowing in and out of the unit and entered information into the BTS. Workflow management

clerks physically moved the bins from unit to unit. Using the BTS, it was possible, for example, to determine how many bins were sent from receiving to check-in during any given period.

**Control and tracking system (CATS)**—The BTS system tracked the bins; the CATS tracked the work on the bins. It provided a means for monitoring the flow of work in the PO's, as well as for capturing operational data for the Management Information System (MIS) on quality assurance (QA) and general production. The CATS environment was the umbrella that included all the components necessary to manage processing operations in the PO's: the mechanics of data, software, and file management. It monitored users who logged in to perform various operations. There were also software and data files for each specific CATS operation. Most CATS data entry operations had the same general structure, consisting of base files, control programs, data entry programs, operation support programs, and reports.

The CATS system included a series of checkpoints, referred to as CATStations, that accessed information regarding the flow of questionnaires. Unlike the BTS, the CATS was found only at certain locations throughout the census processing workflow, usually wherever there was an automated step or data capture was taking place. The CATS was used to control and track the following operations: questionnaire check-in, surname data capture, FACT 90 data-capture operations, film tracking (including film duplication in Jeffersonville, industry and occupation coding, and general coding), split, markup, repair, telephone followup, 100-percent race coding, sample write-in keying, and group quarters data capture.

The CATS monitored the flow of questionnaires through a unit. At each unit, the relevant information was keyed into the system, and the CATS assigned a status number to the batches depending upon their location in the processing flow. The higher the number, the farther along in the processing cycle the batch was. The status numbers regulated the flow of the questionnaires and prevented batches from leaving any unit before completion. If a batch (CU, film roll, etc) was prematurely entered at a CATStation unit, the CATS notified the control clerk of the error. The CATS system also provided other valuable information for management, such as how fast the operation was being completed. In addition, the CATS generated quality assurance data such as the number of keystrokes per hour individual keyers entered. Each automated operation had a separate CATS "name" (e.g., CATS in the camera preparation unit was called CATS CU, because it tracked camera units).

**Automated recordkeeping system (ARS)**—During the 1990 census, the seven PO's transferred national population and housing data from incoming questionnaires to microfilm to FOSDIC computer files. The PO's performed both clerical and automated activities to accomplish this data transfer. "Total process control," an ongoing process-improvement system, was used to inspect and manage the

quality of the clerical PO activities. Each of the operational units involved in processing data from the 1990 census produced some type of report on the quality of its work. Effectively improving these operations required the collection, analysis, and timely feedback of reliable QA data.

Only the QA staff had access to the ARS software used to collect QA data. The QA section used the ARS to provide summaries of these data to assist unit supervisors in identifying and resolving operational and personnel problems and to give HQ and PO management information on PO operations. PO clerical supervisors were responsible for collecting the data on the automated recordkeeping system forms for their activities. Completed forms were sent to or collected by the QA unit, where section clerks keyed them into the ARS, which then verified the entries. Nightly, a PO computer maintenance program generated preselected QA reports for the PO supervisors. Weekly, a data base containing the previous week's entered QA data was transmitted to the DOD, which in turn transferred the data to the Statistical Support Division<sup>19</sup> for evaluation and monitoring.

## SEARCH/MATCH

The search/match operation was conducted during the 1990 decennial census to help ensure that each person was enumerated at what is defined as his or her "usual residence." Each person had to be counted at this location for apportionment purposes. A usual residence was defined as "the place where the person lives and sleeps most of the time." Search/match was designed to improve both within-household and whole-household coverage.

There were six different search forms processed during search/match. Many people listed on a search form were not at their usual residence on Census Day; for example, they may have been at a hotel on Census Day. In order to ensure that they were counted at their usual home, the Census Bureau searched the census questionnaire for their reported usual residence to determine if they were counted there. If they were not counted at their reported usual residence, they were added to the census at that address.

The search/match unit received the following census forms, all of which were considered "search forms":

*Form D-190, Search Record for Whole Household Usual Home Elsewhere (WHUHE)*; a D-190 search record was generated for either whole households that usually lived elsewhere, or for recent-mover whole households that lived elsewhere on census day. All searchable D-190 search records were processed during the search/match operation.

If a respondent indicated on his or her census questionnaire that the usual residence of the entire household was somewhere other than the address where they received

<sup>19</sup>In April 1992, this division's name was changed to the Decennial Statistical Studies Division.

their census questionnaire, the DO or PO staff completed a D-190 search record for the household. After verification, the household was removed from the census questionnaire where they reported that they did not usually reside. The people were listed on the D-190 search record, which was sent to search/match to determine whether they were counted at their usual residence, and if not, to add them there.

The vacant/delete/movers check generated mover-UHE cases. This operation revisited vacant and deleted housing units. If an enumerator located a respondent who indicated that the entire household moved into the unit sometime after census day and did not complete a questionnaire at the census day address, the enumerator completed a census questionnaire for the household, indicating that this household had recently moved. DO or PO staff then completed a D-190 search record for the household. The mover-UHE box on the D-190 search record distinguished whole household usual home elsewhere cases from mover-UHE cases.

*Forms D-20A and D-20B, Individual Census Report (ICR's);* enumeration of special places such as hotels, and the nonresponse followup and field followup operations, generated ICR's. They were completed for individuals found at a special place or for visitors or nonfamily residents found at housing units during the nonresponse followup and field followup operations who felt they may not have been counted. An ICR listed only one person. If the respondent indicated that he or she was at the housing unit or special place temporarily and usually lived somewhere else, the ICR was processed during search/match.

*Form D-21, Military Census Report (MCR);* group quarters (GQ) enumeration generated MCR's. Military GQ's were a large subset of all GQ's. All military personnel completed an MCR. The MCR listed only one person. If the respondent listed an off-base UHE address and he or she indicated that the address was not a barracks but a family-type housing unit, the form was processed during search/match.

*Form D-23, Shipboard Census Report (SCR);* GQ enumeration also generated SCR's. All shipboard personnel, both military and maritime, completed an SCR. The SCR was processed in search/match.

*Form D-25, "Were You Counted" (WYC);* the WYC operation was a multimedia publicity campaign designed to encourage individuals to notify the Census Bureau that they might have been missed in the enumeration. The form had space for entering basic census information with a name and address.

*Form D-59B, Parolee/Probationer Information Record (PPIR) forms,* the Parolee/Probationer Coverage Improvement Program and the Parolee/Probationer Coverage Improvement Followup Program were conducted during the 1990 Decennial Census to help ensure complete enumeration of everyone living in the United States. These programs targeted parolees and probationers, a subset of the population that the Census Bureau believed to be subject to

substantial undercount. In addition, because of overrepresentation of Black males in the parolee/probationer population, the Census Bureau also felt that targeting this population would help to address the problem of the differential in the count. PPIR were sent to State parole/probation departments to be distributed to parolees/probationers when they were visited. After the parolees/probationers completed the PPIR's, the corrections offices returned them to the Census Bureau's processing offices.

The Parolee/Probationer Coverage Improvement Followup Program resulted from a low response rate from the initial Parolee/Probationer Coverage Improvement Program. This followup program was different from the initial program in that the followup employed information from administrative lists from the States' department of corrections containing parolee/probationer names, Census Day addresses, and a minimum of two demographic characteristics. Officials of these agencies certified that these data were the addresses of the parolees/probationers as of April 1, 1990.

Search/match involved four primary operations: check-in and sort, geocoding, camera unit/frame number look-up, and matching and transcription.

### Check-in/Sort

The Search/match check-in/sort unit received boxes containing bundles of forms together with a transmittal form (form BC-30 from DO's, form D-1802 from the PO) that showed the type and total number of forms in the box. A unit control clerk opened each box and counted the forms, noted any difference between the count and the reported total on the transmittal form, and placed the checked-in boxes in the sort staging area.

Sorting clerks took one box of search forms at a time from the staging area, attached a Form D-2037, Search/Match Status Label (S/M status label), to every form in the box,<sup>20</sup> and sorted the forms by type into those from States within the PO area, and those that should be referred to another PO. Forms from within the PO area were referred for further sorting. The clerks pulled any forms from States outside the PO area from the box and wrote the appropriate PO (i.e., BAPO (Baltimore), AUPO (Austin), etc.) in item A on the form D-2037 label and placed them in a "For Other PO" box. The control clerk sent the WYC's, D-190 WHUHE's and mover-UHE's, PPIR's, and ICR's to the appropriate processing office; MCR's and SCR's remained at the PO to which they had initially been sent for further processing.

The clerks further sorted the search forms from their own PO area into two groups—those that had been geocoded (the geographic codes, "geocodes," were numeric four-digit address register area (ARA) and three-digit block

<sup>20</sup>The labels were attached at different places on the forms, depending on the type of form. For form D-20A, ICR, the label was attached to p. 3, where the census logo was located, while on D-20B's it went on p. 10. The label was attached to p.8 of the MCR's and SCR's, and was placed on the back of WYC and PPIR forms.

codes, usually entered in the "For Census Use Only" box on each report form), and those that had not been geocoded. Search match forms lacking geocodes were sorted again, based on whether they were "searchable" or "unsearchable." Forms were considered searchable if an urban address had a house number and street name and included one of the following combinations of address information: City and ZIP Code, State and ZIP Code, city and State only, or ZIP Code only. A rural address was considered searchable if it had a rural route number (or star route) and box number or P.O. box number and one of the following combinations: City and ZIP Code, State and ZIP Code, ZIP Code only, or city and State only. Also, if a search form did not have "complete" data (defined as a person name and answers to at least two of the 100-percent population questions) it was unsearchable. The forms (sorted by form type, PO area, presence of a geocode, and whether or not there was a searchable person) were placed in separate boxes by category. There also were special situations, e.g. GQ's, in which search forms were classified as unsearchable. The unit control clerk referred only the searchable cases for further processing.

## Geocoding/Browse

Search forms lacking geocodes, but considered searchable, were routed to the geocoding/browse operation, which (1) geocoded forms; (2) determined whether the exact address or basic street address (BSA) was on the ACF; (3) checked whether the address was a unit in a multiunit structure or a single unit; and (4) for exact address matches, identified the camera unit (CU) and frame number associated with a specific questionnaire.

The geocode assignment clerk collected search forms into batches of 50 geocoded or ungeocoded forms of a single type. These went directly to the ACF browse operation (the ACF browse was a computer program to "browse" the address file for the presence or absence of an address); for batches of ungeocoded forms, the geocoding step was usually performed simultaneously with the ACF browse.

The ACF browse program was "menu driven," and to geocode, the clerk used the DO/ZIP lookup option to locate the DO codes for each form's address, then used the address entry screen to try to pinpoint the ARA and block for a given address. If this enabled the operator to geocode the address, he or she marked box B1 on the D-2037 label on the form; if the address could not be geocoded, box B2 was checked, and the operator placed the form in an "unable to geocode" stack.

When the address on the form exactly matched one on the ACF, the operator marked box C1 on the D-2037 label, entered the ID number in the ID space, and entered the number of units at the basic street address (for urban areas) or block (for rural areas) in the "total units" space at the top of section C. When no address could be found on the ACF, the operator marked box C3 (for urban areas) or C4 (for rural areas) of the label. The operator sorted the geocoded forms based on whether their addresses had

been found on the ACF, labeled index cards to identify forms as (1) unable to geocode, (2) geocoded and found on ACF, or (3) geocoded but not found on ACF, and attached the cards to the appropriate stacks of forms. The operator filled out a Form D-2112, Batch Control Record, with his or her initials and the date and returned the batch to the assignment clerk.

Forms that could not be geocoded by computer were rebatched and sent for clerical geocoding. The coding staff used a variety of reference materials<sup>21</sup> to search for the information required to properly code each form. The order of search normally began with the ZIP Code. Once a ZIP Code was identified for a given address, the clerk used the ACF browse system to search for the DO, ARA, and block codes. If the ZIP Code enabled a match to be made on the ACF, the clerk filled in the appropriate codes on the form; failure to match on the ACF meant the clerk had to go back to other materials. With a ZIP Code, the clerk referred to the ZIP/DO conversion listing to identify the DO code, then the block header record for an identified DO to locate the ARA and block codes for a particular address. Rural addresses required using the PO atlas for a particular DO to find the ARA and block codes for a rural delivery or narrative (e.g., "3 miles west of the junction of State Route 7 and County Road M"). Once these codes had been located, the clerk checked the ACF browse system again for a match. If the ACF browse again failed to match the address, the clerk checked the list/enumerate DO listing for the PO for a possible match.

All geocoded search forms that could not be matched to addresses in the ACF were referred to the appropriate post office for an address-deliverability check. If the address was confirmed by the USPS as undeliverable, all search efforts ceased and the search form(s) involved were returned to the unit assignment clerk, who collected them into batches of 50 each and shelved them until they could be sent for permanent storage. If an address was determined to be deliverable, or deliverable with corrections, the amended address was again searched for on the ACF, and if not found, the clerk handling the case transcribed the address onto a Form D-378, ACF Maintenance Record. The maintenance records were returned to the unit assignment clerk, who collected them on a weekly basis, pulled the pink copy from each and kept them in a folder with the associated search forms. The clerk referred the white and yellow copies of the D-378's for shipment to the BAPO. The BAPO was responsible for maintaining the ACF, and its keying unit keyed the addresses from the D-378's and transmitted the keyed file to headquarters to be matched against the master ACF.

<sup>21</sup>The principal references were the PO atlas (consisting of prelist maps and address registers, or precavass maps and county locator maps with map sheet indexes), the Form D-327, Block Header Records, for each DO serviced by the PO, ZIP + 4 directories for each State in the PO area, ZIP/county conversion listings and ZIP/DO conversion listings, the *Federal Information Processing Standards (FIPS) Publication 55* for each State serviced by the PO, and the list/enumerate DO Listing for each PO.

The BAPO prepared a transaction listing for each PO showing the ID numbers of addresses keyed and the results of the master ACF match, and forwarded the listing to the appropriate PO. The search/match control clerks at each office matched the transaction listings to the pink copies of the D-378's retained in their folders, transferred the ID's from the listings to the associated search forms, and sent the search forms to the assignment clerk, who collected the forms into batches of 50 each and sent them for matching/transcription.

More than 3 million search/match addresses had to be geocoded during census processing; if a search form address could not be clerically geocoded, the processing of that form ended. Clerks returned forms they had geocoded to the unit assignment clerk, who routed them to a QA clerk.

### **Camera Unit/Frame Number (CU/FN) Lookup**

The CU/FN lookup operation was carried out by the ACF browse clerks in the geocoding/browse units and was done in two stages: The first phase, occurring between July 1 and July 31, 1990, covered search cases matched to census ID's listed as "ACF accepts" and representing single-unit addresses. After August 1, requests were printed for all search/match cases matched to census ID's, whether data had already been accepted or not. The clerks received search forms in batches and logged onto the ACF browse program. Each search form already had gone through ACF search, and the clerk checked section C of the D-2037 label (see above). If box C1 was checked, the clerk selected the "Find DO/ID" option from the search menu to find the exact address (if C2 or C4 were marked, the clerk selected the "browse DO/ARA block" option to find the basic street address), and entered the DO code and ID number. The program automatically searched and displayed the address requested; the clerk could then print the questionnaire pages for each person at that address. For MCR batches, the clerk compared the population count in the ACF to that reported under item 2d of the MCR, and marked box D1 on the form status label as either "MCR/ACF match" or "MCR/ACF do not match." Matched MCR/ACF cases underwent no further processing, while nonmatched MCR cases were printed and sent to matching/transcription. After all the "MAD requests" had been printed, the unit control clerk returned all the requests with same batch number to the browse clerk who had been assigned that batch. That clerk separated the batch into two stacks: "CU/FN found," and "CU/FN not found" (prior to August 1, "Accept" was included in these stack identifiers), labeling them with an index card clipped to each, and returned them to the assignment clerk.

### **Matching/Transcription**

The matching/transcription operation involved matching the names of all people on search forms to the household questionnaire copy for the matched address, or to any questionnaire copies for the multiunit/rural blocks from the

lookup operation. The unit clerks received batches of 50 forms of a single type (matching/transcription was performed for all of the types of forms referred for search/match (see above)), and checked the attached batch control records and search/match status labels to determine whether the form ID numbers had been added to the ACF (identified by highlighting the numbers using a yellow marker). If all the ID numbers for a batch had been highlighted, no matching was required and the clerk transcribed every search form. When only some of the search forms were highlighted, those without highlights had to be matched to the corresponding census household questionnaires.

If the total units in item C of the S/M status label was 1 or more than 10, then there would be only 1 copy of the census questionnaire for that search form; search forms with labels indicating 2-10 units in item C had copies of the same number of questionnaires attached. The clerks compared the ID number(s), shown in section C of the form D-2037 attached to each search form, to the last 7 digits of the 11-digit ID number in item G in the "For Census Use Only" box of the copy of census questionnaire. If there was a copy of the census questionnaire required, the clerk attached it to the search form, and it was ready for matching. If no copy was found, the search form data were transcribed onto a household questionnaire.

Clerks matched names (and when necessary, age and sex) reported on the search forms to those on the forms D-190, ICR's, MCR's, SCR's, and PPIR's. When the name was missing or incomplete, the clerks checked other information on the search form to help match the name. (When the search form had a complete name, but the household questionnaire did not, then the search-form name was considered to match the census questionnaire, unless the clerk was certain they were not a match (e.g., age differed by more than 3 years or sex was different.)

Once every person on a search form matched those on a household questionnaire, the clerk entered the total number of people from the former, and the total number of people that matched, in section F of the S/M status label, and attached an index card identifying them as "form matched," and placed them in a reserved stack at the work station. If some but not all of the search people matched the questionnaire people, the clerk circled in red pencil the ID number in section C of the status label, and the names on the search form that did not match and needed to be added to the census, and indicated the number of people on the search form and the number matched on the status label. If none of the search people matched the census questionnaire, the clerk indicated this on the label, circled the ID number in red, and attached the copy of the questionnaire to the search form. Search forms with no matches, or where not all people were matched, were referred for transcription.

Search form people not found on the copy of the census questionnaire for the address were added to the census at that address. Clerks transcribed information from the search forms to Forms D-2A, Enumerator Questionnaires, for all nonmatched people. During the search/match process,

clerks transcribed data from almost 1.1 million search forms to enumerator questionnaires. Clerks entered the DO code, seven-digit ID number, four-digit ARA code, and three-digit block code from the status label, and the address from the search form, on each transcribed questionnaire, then entered as much information as was available for each circled name on the search form. For the sample ICR's (D-20B), SCR's, and MCR's that had to be transcribed onto long-form enumerator questionnaires, the clerks also had to transcribe any other information on the search form, and placed a piece of black FOSDIC tape in the upper right-hand corner on the page containing the data for the last person listed. As they completed each case, the clerks clipped the forms together with an index card labeled "forms transcribed" and stacked them at the work station. Addresses added to the ACF had to be assigned new ID numbers, and since the ID number was newly assigned, there would be no questionnaire in the PO for that number. Accordingly, the search-person information for those addresses had to be transcribed onto enumerator questionnaires as well, using essentially the same procedures used for the name transcription. Materials for completed cases were clipped together, with an index card labeled "forms transcribed" and stacked at the work station.

As work on a batch was completed, the clerk assigned entered his or her initials, the date completed, number of forms transcribed, and number of forms matched, on the Form D2112, Batch Flow Control Record, and returned the batch to the unit control clerk. Transcribed enumerator questionnaires were then routed to the camera prep unit and added to the processing stream.

### **Quality Assurance (QA)**

The three major search/match unit's production operations—geocoding, camera unit/frame number lookup, and match/transcription—all were subjected to QA verification. The actual methods used were similar for all three, although the number of individual forms checked varied. Each of the operational subunits included a QA clerk, and

as batches of search forms were processed by the specific unit, the assignment clerk in each routed those batches to their respective QA clerks for verification (and correction when required). All computer-assisted geocoded batches of report forms were subject to a 5-percent QA verification review before being sent on for ACF browse, while a single form from each CU/FN lookup unit batch was verified, and the match/transcription operation batches were 10-percent verified.

The respective QA clerks reviewed the QA sample forms to check the following:

*Geocoding*—The clerk reviewed each selected form to determine whether it had (1) been geocoded or (2) been incorrectly geocoded. Batches of forms that had completed the ACF check also were verified on a 5-percent basis. Clerks matched the search address on the QA sample forms to the ACF a second time to determine whether (1) a search address had been incorrectly matched to a different address, (2) a search address was not matched to an address on the ACF when a matching address was present, or (3) no BSA had been found when one was present on the ACF. Batches of forms with no BSA found were subjected to 10-percent QA sampling, with a review to check that the reported BSA actually did not match a BSA on the ACF.

*CU/FN Lookup*—The QA clerk checked to determine that the CU/FN(s) assigned were correct, and that the identification (ID) number(s) and, if applicable, the population (POP) count were correctly transcribed to the form D-2037 label.

*Match/Transcription*—The clerk reviewed the forms to make certain that the name and the appropriate personal data for unmatched people on the search form had been correctly transcribed to a questionnaire.

The QA clerks corrected any errors detected, using the same procedures employed by the respective operating units; then they recorded the number of forms verified, the number and kinds of errors identified, and added their initials and the date in the appropriate spaces on the Form D-2112, Search/Match Control Record, and returned the D-2112 and attached batches to the unit assignment clerk.

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# CHAPTER 9.

## Sampling and Estimation

### SAMPLING

#### Basic Design

The 1990 census used two household questionnaires. The first, called the 100-percent, or "short," form, requested basic information for every person and housing unit (e.g., age, race, relationship to householder, number of rooms, and value or rent). The sample, or "long," form, asked the 100-percent questions plus additional ones (e.g., income, commuting characteristics) for a sample of persons and housing units. The basic sampling unit was the housing unit, including all occupants. There were three different housing unit sampling rates: 1-in-8, 1-in-6, and 1-in-2 (or an overall average of about 1-in-6). For persons living in group quarters, the sampling unit was the person, with only one rate, 1-in-6.

The 1990 census had these variable sampling rates in order to arrive at fairly accurate estimates for small areas and to decrease respondent burden in more densely populated areas, while maintaining the reliability of the data. When all sampling rates and implementation were taken into account across the Nation, this census sampled about 15 percent of the population and 16 percent of the housing units.

The Census Bureau based these varying rates on precensus estimates of the size of incorporated places and census tracts or block-numbering areas (BNA's). (For census geography, see ch. 3.) Therefore, the observed sampling rate for any geographic area varied accordingly. More detailed tabulations of the actual sampling rates for population and housing units for various levels of geography can be found in 1990 Census of Population and Housing, *Summary Social, Economic, and Housing Characteristics*, series 1990 CPH-5.

The sample-designation method for housing units depended on the data-collection procedure (see ch. 6 for details). Approximately 96.6 million housing units were enumerated by mail procedures (86.2 million by mailout/mailback and 10.4 million by mailback only). Here, the census had a computerized master address list (see ch. 4), on which the appropriate units were electronically designated as sample units. The questionnaires were either mailed or hand-delivered to the addresses with instructions to complete and mail back the form.

Housing units in governmental units (GU's) with a precensus (1988) estimated population of fewer than 2,500 persons were sampled at 1-in-2. The staff defined GU's for sampling purposes as all incorporated places, all counties, and county equivalents such as parishes in

Louisiana, and minor civil divisions in Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin. Housing units in census tracts and BNA's with an estimated precensus housing-unit count below 2,000 housing units were sampled at 1-in-6 for those portions not in small GU's (i.e., those with an estimated population less than 2,500). Housing units within tracts and BNA's with an estimated 2,000 or more housing units were sampled at 1-in-8 for those portions not in small GU's.

In list/enumerate areas (about 5.5 million housing units), the enumerators had blank address registers with designated sample lines. Beginning about Census Day, they systematically canvassed their assigned areas and listed all housing units in the address register in the order in which they encountered them on their prescribed paths. They collected 100-percent data for all units, plus sample information for any housing unit listed on a designated sample line. In list/enumerate areas, the housing-unit sampling rate was 1-in-2 when fewer than 2,500 persons were estimated to live in a GU, but elsewhere, 1-in-6. A sample tolerance check detected and corrected enumerator biases in designating the sample.

Housing units in American Indian reservations, tribal jurisdiction statistical areas, and Alaska Native villages were sampled according to the same criteria as other GU's, except that the sampling rates were based on the size of the American Indian and Alaska Native populations in those areas as measured in the 1980 census. Trust lands were sampled at the same rate as their associated reservations. Census designated places in Hawaii (which had no incorporated places in 1990) were also sampled like all other GU's.

### ESTIMATION

#### Sample Items

As in previous censuses, all estimation procedures used for the 1990 census required the assignment of weights to individual sample person and housing-unit records. These records were subsequently stored on data files that had undergone various computer edits for accuracy and consistency. (See ch. 8.) For all census tabulation areas, the characteristic totals were estimated by simply summing the weights assigned to the appropriate sample person or housing-unit records. The procedure selected to assign weights to sample records had to meet the following criteria:

1. Only a single weight was to be assigned to each individual sample person or housing-unit record. This constraint was imposed because the massive amount of data published would render the storing, controlling, and utilization of different weights for each item infeasible.
2. The assigned weights were required to be integers. This was necessary for data users' convenience, since it eliminated problems of differences due to rounding between data tables with similar marginal categories. It was also desirable because it would facilitate internal Bureau review of the complex weighting and tabulation programs.
3. The sample estimates of certain characteristics collected for the entire population were to equal the 100-percent (complete-count) figures. This agreement was required for total population and housing-unit counts for as many tabulation areas as possible. Agreement between the sample estimates and 100-percent figures for other characteristics such as age, race, sex, and Hispanic origin were also to be achieved whenever possible. This constraint was imposed primarily for the convenience of the data users. (A more detailed explanation of reasons for differences between 100-percent counts and sample estimates appeared in "User Note 2" for the Census of Population and Housing, 1990: *Summary Tape File 3*.)
4. The estimation procedure was designed to dampen the effect of any bias that occurred in sample selection.

In general, the estimation procedure dealt with groups of records within specially defined areas called "weighting areas" (described below). Within each weighting area, complete counts and sample counts were obtained for various characteristics. For these characteristics, the sample was weighted to agree with the complete counts of these same characteristics, using an iterative procedure (as discussed below) to assign weights to the sample records within each weighting area.

## Background and Research

In the 1960 census, the Bureau derived estimates based on sample data by using a post-stratified ratio-estimation procedure. Each sample record was first classified into a ratio estimate group. There were 44 age, sex, and race groups for persons, and 7 groups for housing units by race of occupants, occupancy, and tenure. The complete count for each group was determined and weights were assigned to the sample records to sum to the complete count for the group. It was sometimes necessary to combine groups to meet conditions imposed to control the variance of estimates.

After the 1960 census, the staff examined the properties of a number of different ratio-estimation procedures and used the so-called "raking" one. Experience with the

1960 estimator suggested that the procedure ought to incorporate household size in the definition of the ratio-estimate groups. However, the number of these groups defined by expanding each of the 44 groups by 6 household size categories could not be used efficiently by an estimator of the 1960 type, and other estimators therefore had to be considered.

When it chose the estimator to be used in the 1970 census, the Bureau specified the following criteria: It should (1) dampen the effect of any biases that occurred in sample selection, (2) reduce the variance of sample estimates, (3) improve the consistency between complete counts and sample estimates, (4) be economical to execute, and (5) permit reasonably accurate estimates of sampling error to be computed.

Prior to the 1980 census, the Bureau decided to conduct an empirical and theoretical study (using 1970 census data) to compare alternative estimation procedures. These included a simple inflation estimator, a post-stratified ratio estimator, and the "raking" ratio estimator. In addition, it tested various characteristics, for which sample and complete-count (i.e., 100-percent) totals were available, in conjunction with the post-stratified and raking ratio estimators.

Considering the same criteria for choosing an estimator as noted above, the results of the research indicated the raking ratio estimator, using the groups listed later in this section, was preferable, particularly with respect to controlling the effect of sampling biases. The staff also investigated this estimator's convergence properties. Since the 1990 census sample was selected using a variable rate sampling design utilizing three sampling rates, the Bureau decided to incorporate sampling rate as the fourth dimension in the ratio-estimation procedures.

In 1990, the staff completed a family estimates empirical study designed to compare several methods for producing sample tabulations of family characteristics. Based on results from the study, it was concluded that none of the methods under consideration was significantly better than the method used in 1980 to produce family estimates. In 1990, as in 1980, family estimates were tabulated by adding the weight of the householder in family households.

## Definition of Weighting Areas

Each State was divided into weighting areas prior to performing the raking ratio-estimation procedure. Weighting areas were, in general, contiguous portions of geography that closely agreed with census tabulation areas within a county and never crossed county or State boundaries. Weighting areas had to have a minimum sample of 400 persons. In counties with a sample count of less than 400 persons, the minimum sample size requirement was relaxed so the entire county could be a weighting area.

## Ratio Estimation Groups and Weighting Procedure

Within a weighting area, the ratio-estimation procedure for persons was performed in four stages. For persons, the first stage applied 17 household-type groups. The second

stage used two groups: one sampling rate of 1-in-2, and another where the rate was below 1-in-2. The third stage used the dichotomy, householders/nonhouseholders. The fourth stage applied 180 aggregate age-sex-race-Hispanic origin categories. The stages were as follows:

| <b>Group</b> | <b>Stage I—Type of Household</b>                                      |
|--------------|---|
|              | Persons in housing units with a family with own children under 18:    |
| 1            | 2 persons in housing unit   |
| 2            | 3 persons in housing unit   |
| 3            | 4 persons in housing unit   |
| 4            | 5 to 7 persons in housing unit  |
| 5            | 8 or more persons in housing unit                                     |
|              | Persons in housing units with a family without own children under 18: |
| 6-10         | 2 through 8 or more persons in housing unit                           |
|              | Persons in all other housing units:                                   |
| 11           | 1 person in housing unit  |
| 12-16        | 2 through 8 or more persons in housing unit                           |
| 17           | Persons in group quarters   |
|              | <b>Stage II—Sampling Rates</b>  |
| 1            | Sampling rate of 1-in-2   |
| 2            | Sampling rate below 1-in-2  |
|              | <b>Stage III—Householder/Nonhouseholder</b>                           |
| 1            | Householder   |
| 2            | Nonhouseholder  |
|              | <b>Stage IV—Age/Sex/Race/Hispanic Origin</b>                          |
|              | White   |
|              | Persons of Hispanic origin  |
|              | Male:   |
| 1            | 0 to 4 years of age   |
| 2            | 5 to 14 years of age  |
| 3            | 15 to 19 years of age   |
| 4            | 20 to 24 years of age   |
| 5            | 25 to 34 years of age   |
| 6            | 35 to 54 years of age   |
| 7            | 55 to 64 years of age   |
| 8            | 65 to 74 years of age   |
| 9            | 75 years of age or older  |
|              | Female:   |
| 10-18        | Same age categories as groups 1 to 9                                  |
|              | Persons not of Hispanic origin  |
| 19-36        | Same age and sex categories as groups 1 to 18                         |
|              | Black   |
| 37-72        | Same age/sex/Hispanic origin categories as groups 1 to 36             |
|              | Asian or Pacific Islander   |
| 73-108       | Same age/sex/Hispanic origin categories as groups 1 to 36             |
|              | American Indian, Eskimo or Aleut                                      |
| 109-144      | Same age/sex/Hispanic origin categories as groups 1 to 36             |
|              | Other race (includes those races not listed above)                    |
| 145-180      | Same age/sex/Hispanic origin categories as groups 1 to 36             |

Within a weighting area, the first step in the estimation procedure was to assign an initial weight to each sample

person record. This weight was approximately equal to the inverse of the probability of selecting a person for the census sample.

The next step in the estimation procedure, prior to iterative proportional fitting, was to combine categories in each of the four estimation stages, when needed, to increase the reliability of the ratio estimation procedure. For each stage, any group that did not meet certain criteria for the unweighted sample count or for the ratio of the 100-percent count to the initially weighted sample count was combined, or collapsed, with another group in the same stage according to a specified collapsing pattern. The fourth stage applied an additional criterion concerning the number of complete-count persons in each race/origin category.

As the final step, the initial weights underwent four stages of ratio adjustment applying the grouping procedures described above. At the first stage, the ratio of the complete census count to the sum of the initial weights for each sample person was computed for each stage I group. The initial weight assigned to each person in a group was then multiplied by the stage I group ratio to produce an adjusted weight.

In stage II, the stage I adjusted weights were again adjusted by the ratio of the complete census count to the sum of the stage I weights for sample persons in each stage II group.

Next, at stage III, the stage II weights were adjusted by the ratio of the complete census count to the sum of the stage II weights for sample persons in each stage III group.

Finally, at stage IV, the stage III weights were adjusted by the ratio of the complete census count to the sum of the stage III weights for sample persons in each stage IV group. The four stages of ratio adjustment were performed twice (two iterations) in the order given above. The weights obtained from the second iteration for stage IV were assigned to the sample person records. However, to avoid complications in rounding for tabulated data, only whole number weights were assigned. For example, if the final weight of persons in a particular group was 7.25, then one-quarter of the sample persons in this group were randomly assigned a weight of 8, while the remaining three-quarters received a weight of 7.

The ratio-estimation procedure for housing units was essentially the same as that for persons, except that vacant units were treated differently. The occupied housing unit ratio-estimation procedure was done in four stages, while the one for vacant units was done in a single stage. The first stage for occupied housing units applied 16 household-type categories, while the second stage used the two sampling categories described above for persons. The third stage applied three units-in-building categories, i.e., single units, multiunits less than 10, and multiunits of 10 or more. The fourth stage could potentially use 200 tenure-race-Hispanic origin-rent/value groups. The stages for ratio estimation for housing units were as follows:

| <b>Group</b>   |       | <b>OCCUPIED HOUSING UNITS</b>                                       |
|--|-------|---|
| <b>Stage I: Type of Household</b>                          |       |   |
| Housing units with a family with own children under 18:    |       |   |
| 1  | 2     | 2 persons in housing unit   |
| 2  | 3     | 3 persons in housing unit   |
| 3  | 4     | 4 persons in housing unit   |
| 4  | 5     | 5 to 7 persons in housing unit                                      |
| 5  | 6     | 8 or more persons in housing unit                                   |
| Housing units with a family without own children under 18: |       |   |
| 6-10   | 11    | 2 persons in housing unit through 8 or more persons in housing unit |
| All other housing units:                                   |       |   |
| 11   | 12-16 | 1 person in housing unit  |
|  |       | 2 persons in housing unit through 8 or more persons in housing unit |

**Stage II: Sampling Rate Category**

|   |   |                                |
|---|---|--------------------------------|
| 1 | 2 | Sampling rate of 1-in-2        |
|   |   | Sampling rate less than 1-in-2 |

**Stage III: Units in Building**

|   |   |   |   |
|---|---|---|---|
| 1 | 2 | 3 | Single unit   |
|   |   |   | Multiunit consisting of less than 10 individual units |
|   |   |   | Multiunit consisting of at least 10 individual units  |

**Stage IV: Tenure/Race and Origin of Householder/Value or Rent**

**Owner**

White race (householder)  
Hispanic origin (householder)

Value of housing unit:

|        |   |   |   |   |   |   |   |   |    |  |
|--------|---|---|---|---|---|---|---|---|----|--|
| 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |  |
|        |   |   |   |   |   |   |   |   |    | Less than \$20,000   |
|        |   |   |   |   |   |   |   |   |    | \$20,000 to \$39,999   |
|        |   |   |   |   |   |   |   |   |    | \$40,000 to \$59,999   |
|        |   |   |   |   |   |   |   |   |    | \$60,000 to \$79,999   |
|        |   |   |   |   |   |   |   |   |    | \$80,000 to \$99,999   |
|        |   |   |   |   |   |   |   |   |    | \$100,000 to \$149,999                                       |
|        |   |   |   |   |   |   |   |   |    | \$150,000 to \$249,999                                       |
|        |   |   |   |   |   |   |   |   |    | \$250,000 to \$299,999                                       |
|        |   |   |   |   |   |   |   |   |    | \$300,000 plus   |
|        |   |   |   |   |   |   |   |   |    | Other <sup>1</sup>   |
|        |   |   |   |   |   |   |   |   |    | Householder not of Hispanic origin                           |
| 11-20  |   |   |   |   |   |   |   |   |    | Same value categories as groups 1 to 10                      |
|        |   |   |   |   |   |   |   |   |    | Black (householder)  |
| 21-40  |   |   |   |   |   |   |   |   |    | Same value/Hispanic origin categories as groups 1 through 20 |
|        |   |   |   |   |   |   |   |   |    | Asian or Pacific islander (householder)                      |
| 41-60  |   |   |   |   |   |   |   |   |    | Same value/Hispanic origin categories as groups 1 through 20 |
|        |   |   |   |   |   |   |   |   |    | American Indian, Eskimo, or Aleut (householder)              |
| 61-80  |   |   |   |   |   |   |   |   |    | Same value/Hispanic origin categories as groups 1 through 20 |
|        |   |   |   |   |   |   |   |   |    | Other race (householder)                                     |
| 81-100 |   |   |   |   |   |   |   |   |    | Same value/Hispanic origin categories as groups 1 through 20 |

**Renter**

White (householder)  
Hispanic origin (householder)

Rent categories:

|     |     |     |                 |
|-----|-----|-----|-----------------|
| 101 | 102 | 103 | Less than \$100 |
|     |     |     | \$100 to \$199  |
|     |     |     | \$200 to \$299  |

| <b>Group</b>                |     | <b>OCCUPIED HOUSING UNITS</b>                             |                 |
|-----------------------------|-----|---|-----------------|
| 104                         | 105 | \$300 to \$399  |                 |
|                             |     | \$400 to \$499  |                 |
| 106                         | 107 | \$500 to \$599  |                 |
|                             |     | \$600 to \$749  |                 |
| 108                         | 109 | \$750 to \$999  |                 |
|                             |     | \$1,000+  |                 |
| 110                         |     | No cash rent  |                 |
|                             |     | Householder not of Hispanic origin                        |                 |
| 111-120                     |     | Same rent categories as groups 101 through 110            |                 |
|                             |     | Black (householder)                                       |                 |
| 121-140                     |     | Same rent-Hispanic origin categories as groups 101 to 120 |                 |
|                             |     | Asian or Pacific Islander (householder)                   |                 |
| 141-160                     |     | Same rent-Hispanic origin categories as groups 101 to 120 |                 |
|                             |     | American Indian, Eskimo, or Aleut (householder)           |                 |
| 161-180                     |     | Same rent-Hispanic origin categories as groups 101 to 120 |                 |
|                             |     | Other race (householder)                                  |                 |
| 181-200                     |     | Same rent-Hispanic origin categories as groups 101 to 120 |                 |
| <b>Vacant housing units</b> |     |   |                 |
| 1                           | 2   | 3   | Vacant for rent |
|                             |     |   | Vacant for sale |
|                             |     |   | Other vacant    |

<sup>1</sup>Value of units in this category results from other factors besides housing value alone, for example, inclusion of more than 10 acres of land, or presence of a business establishment on the premises.

The estimates produced by this procedure realized some of the gains in sampling efficiency that would have resulted if the population had been stratified into the ratio-estimation groups before sampling, and if the sampling rate had been applied independently to each group. The net effect was a reduction in both the standard error and the possible bias of most estimated characteristics to levels below what would have resulted from simply using the initial, unadjusted weight. A byproduct of this estimation procedure was that the estimates from the sample were, for the most part, consistent with the 100-percent figures for the population and housing unit groups used in the estimation procedure.

**Weighting Approval Process**

In the 1990 census, the weighting operation was approved in two phases for each State as the States were processed. For phase 1, Bureau headquarters staff received preliminary output from the weighting operation that gave both detailed and summary information concerning the weighting operation for each weighting area in a State. The output included certain demographic counts, displays of marginal weighting matrix counts, diaries of the weighting area formation and weighting matrix collapsing, and other analytical data relating to the weighting operations. For phase 2, the staff examined the phase 1 output, requested more detailed output as required for selected weighting areas, and identified and corrected problems.

## SAMPLING VARIABILITY

### Introduction

Statistics based on a sample almost always differ somewhat from figures that would have been obtained if a complete census had been taken using the same questionnaires, instructions, and enumerators. Sample results are also subject to the same response, reporting, and processing errors which would be present in data from a complete census.

So that sample statistics from the census would be properly interpreted, a statement on their reliability appeared in census publications. The estimates of reliability reflected sampling error and the effect of the estimation procedure but did not reflect the full effect of response or processing variance, or any effect of bias arising in collection, processing, or estimation.

### Presenting Sampling Errors

**Basic design**—A major concern in the choice of a method of presenting sampling errors arose from the number of statistics produced. To compute and show the sampling error for each published characteristic in each tabulation area would have been costly and time-consuming, and it also would have doubled the number of pages needed to present the results in published volumes. The Bureau decided, therefore, to group the individual census items into homogeneous classes and show in the publications the average of the sampling errors for the items in each class.

Almost all of the statistics tabulated from the census sample could be characterized as 0-1 variates, that is, the person or housing unit was assigned the value one if that person or housing unit possessed the characteristic, and zero otherwise. The design of the census sample and the ratio-estimation procedure used suggested that the variances would usually have a fairly simple relationship to those arising from a simple random sample of the same size. This led to a decision to present the sampling errors in the form of "design factors"—the ratio of the estimate of the standard error of the census sample to the standard error for a 1-in-6 simple random sample. Design factors were calculated for a set of data items within each weighting area. The simple average of data-item design factors by sampling-rate category was calculated across weighting areas within the State. The average design factor (weighted by the weighted count of the data item) was then computed over data items by subjects, e.g., place of work or poverty.

This decision led to the following method of presenting data on sampling errors. Each 1990 census report contained three tables. Two of the tables showed the standard errors of a 1-in-6 simple random sample for 0-1 characteristics. One of the tables applied to estimates of totals, the other one to percentages. They showed the values of

$$\sqrt{5 \hat{Y} \left(1 - \frac{\hat{Y}}{N}\right)}$$

where  $N$  is the size of the area (population or housing units) and  $\hat{Y}$  is the estimated total and

$$\sqrt{\frac{5}{B} \hat{p} (100 - \hat{p})}$$

where  $B$  is the base of the estimated percentage  $\hat{p}$ . The third table reflected the design effect, that is, it provided design factors to be applied to either of the first two tables. Readers were required to find the design factor for the subject area of interest (e.g., language usage, or number of rooms) in the third table based on the observed sampling rate. The design-factor table reflected variability in the observed sampling rates that occurred due to the census sample design (i.e., due to the three sampling rates that were used). They then multiplied the factor shown in that table by the appropriate standard error from one of the first two tables to obtain an estimate of the standard error of the census statistic of interest.

### Variance Estimation for the Census

**Basic design**—To produce the design factors, it was necessary to estimate the variance of the census statistics. Because a complex estimator and a systematic sample of clusters (households) were used, no simple mathematical formula could be derived that would directly estimate the variance from the census sample. The variance of census estimates was therefore approximated by a random-group procedure.

The general procedure was to split the sample systematically in each weighting area into 25 subsamples and, for a particular characteristic, to calculate the sum of squares of the subsample totals minus the average of the 25 subsample totals. The general formula of the variance estimator for a particular estimate ( $\hat{X}$ ) was as follows:

$$\text{Var}(\hat{X}) = (1-f_0) \frac{25}{24} \sum_{i=1}^{25} \left(\hat{X}_i - \frac{\hat{X}}{25}\right)^2$$

where:

$\hat{X}_i$  is the weighted total of the characteristic of interest in a weighting area based on the records assigned to the  $i$ -th subsample

$\hat{X}$  is the sum of the 25 values of  $\hat{X}_i$  ( $\hat{X} = \sum_{i=1}^{25} \hat{X}_i$ )

$f_0$  = observed sampling fraction in the weighting area; in terms of persons or housing units as appropriate.

Variance estimates were produced for over 1,000 population and housing characteristics that appeared on summary tape file (STF) 3.

The choice of the particular variance-estimation technique was also based on the results of an empirical research study conducted prior to the 1980 census. This study was designed to compare the reliability and accuracy of four commonly recommended procedures for estimating the variance of the complex estimator used in the 1980 census.

A Multiple Random Starts study determined whether using multiple random starts rather than a single random start in selecting the systematic sample for the census would reduce the bias component of the variance estimates. The conclusion was that any reduction in the total error of the census variance estimate would be offset by an increase (significant for some characteristics) in the variance of the census sample estimates.

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# CHAPTER 10.

## Data Products and Dissemination

### THE 1990 CENSUS TABULATION AND PUBLICATION PROGRAM

#### Introduction

As in the past, the Census Bureau's first priority was to deliver specific data from the decennial census by deadlines that Title 13, U.S. Code, Sections 141(b) and (c) mandated:

- Within 9 months after Census Day, the Secretary of Commerce would deliver to the President official population counts by State for purposes of reapportioning the seats in the House of Representatives, along with the number of seats per State calculated according to the method Congress heretofore had specified (but could change if it wished). The Secretary did this on December 26, 1990, and released the figures to the news media at the same time. The President formally transmitted the tabulations to the House on January 3, 1991.
- Within 1 year after Census Day, the Bureau had to give each State a set of population tabulations, by specified geographic areas, for use in determining congressional, State, and local legislative boundaries. The Director did this from January through March 1991. For detail, see "1990 Census Redistricting Data Program," on page 13.

Aside from these requirements, one of the major objectives of the 1990 tabulation and publication program was to release the census data faster than had been done for 1980. To meet that objective as well as other data needs users had expressed, the staff made some important changes in the program for 1990:

- Far more data were to be published earlier, and often with expanded data as well, in electronic form, not only computer tape, but also on compact disc (CD-ROM—compact disc, read-only memory) and by online service, making it possible for users to have them sooner than on paper. The initial plan was that the use of microfiche would continue, but principally as extracts from tape rather than as an alternative to the paper copies. (A 1989 survey of data users indicated that they still needed fiche, even though CD-ROM would be the upcoming choice.) Ultimately, with isolated exceptions (such as census tract/street indexes), the Bureau would produce microfiche only for the printed (paper) reports. Resources would be diverted to CD-ROM instead.
- The staff would try to devise a new disclosure-avoidance method for the publications. (See p. 5.) Users found that the suppression techniques in the 1980 reports limited their ability to use the data.

- There were no preliminary or advance reports, once needed because of the length of time it took to publish final tabulations. Having fewer printed report series would maintain detail but minimize redundancy. Much of the information heretofore shown in reports like the *1980 Detailed Population Characteristics* or *Metropolitan Housing Characteristics* would be shifted to other products, such as subject reports and a new series of associated computer files (subject summary tape files (SSTF's)). The SSTF's would have more geographic detail than the printed volumes. There were 40 subject reports scheduled for 1990, 3 fewer than for 1980 (but, as for 1980, a number had to be cancelled (see app. 10A), principally because of budgetary constraints). In general, these reports offered only national-level tabulations, although some identified States, metropolitan areas, counties, or large cities.
- Statistics by race and Hispanic origin gained greater prominence, with far more detail than 1980 about population subgroups, such as national origin. Further, especially on the machine-readable products, the user could locate in one place all the information for each group rather than move topically from one set of tables to another.
- Data for statistical or other areas that crossed State boundaries would be released in separate reports, so that processing of general-use subject reports would not be delayed.
- The number of census blocks represented in the tabulations grew from 2.5 million in 1980 to 7.0 million in 1990. The primary medium for block and block-group tables, as for 1980, was the public-use summary tape file (STF) 1B. While extracts of the 1980 tables had appeared on microfiche, those for 1990 would be put on CD-ROM. (See p. 19.)
- Users could order from the Data User Services Division (DUSD) large-scale, electrostatically plotted maps (to be produced in the Bureau's regional offices) to go with their small-area census data. The Government Printing Office decided in the spring of 1992 that it would reproduce and sell census tract and block-numbering area outline maps (from the electrostatic prints) only, and distribute copies to Federal depository libraries.

The process for designing the 1990 tabulation and publication program began early in the decade of the 1980's, and included the following:

- An examination of current and emerging legislation that could affect the requirements for census information.
- Evaluation of previous censuses' tabulations and publications, and of new dissemination media.
- Consultation with congressional oversight committees concerned with the census, and meetings with a Federal interagency council on the 1990 census organized and chaired by the Office of Management and Budget. This council coordinated the various agencies' requests for census data. The National Academy of Sciences/National Research Council's Committee on National Statistics had a panel on decennial census plans that likewise contributed advice. (See ch. 2 and app. A elsewhere in this history.)
- The Bureau and the State data centers sponsored 65 local public meetings in major cities and/or State capitals (and in Puerto Rico and the Virgin Islands) between April 1984 and October 1985 to collect recommendations on planning the census and its products. (See ch. 2.)
- Data users made recommendations at 10 regional meetings in the spring of 1986 (Washington, DC; Knoxville, TN; Chicago, IL; Denver, CO; Portland, ME; Los Angeles, CA; Seattle, WA; Dallas, TX; Detroit, MI; and New York, NY). Later, a national conference gathered additional recommendations to refine the proposals discussed at the regional meetings. Recommendations also came from data users and their professional organizations by correspondence and at conferences, meetings, and the like. In addition to the Bureau's public advisory committees, contributors included such groups as the Population Association of America (PAA), the Association of Public Data Users (APDU), the Council of Professional Associations on Federal Statistics (COPAFS), and the Housing Statistics Users Group (HSUG).

Data users were virtually unanimous in their calls for the Bureau to get the 1990 census products out faster than for 1980, establish a release schedule early, and stay with it.

While tabulation/publication program planning was still in its early stages in the fall and winter of 1984-85, the Decennial Planning Division<sup>1</sup> (DPLD) formed a 1990 Data Products Working Group that reviewed tabulation, publication, and dissemination strategies from the 1980 census. The six members (one each from DPLD, DUSD, Population (POP), and Housing (HOUS; later Housing and Household Economic Statistics (HHES)) Divisions, and two from the Decennial Operations Division (DOD)) listed problems/errors that occurred during 1980 census processing and product release, and suggested solutions. Their recommendations in 1986 were turned over to a 1990 Data Products Planning Group (DPPG)<sup>2</sup> made up of representatives from the

divisions primarily involved in product development, clearance, and dissemination. These were the divisions participating in the working group (see above) plus Geography (GEO), Administrative and Publications Services (APSD), and Statistical Support (STSD; later Decennial Statistical Studies (DSSD)) Divisions, and the Director's (DIR) Office.

The production (as distinguished from the planning) described later in this chapter began in 1989 with preparatory and operational activities that created edited detail files, continued through tabulation/publication (TAB/PUB) operations, and ended when the Bureau released the products to the public from late 1990 forward.

Following the 1986 round of user meetings, DPLD prepared a plan for fiscal years 1987 through 1993 (the end of the 1990 census period) that outlined several proposals. Among these were to reduce the size of printed reports by moving detail to electronic media and making the printed reports more focused. Through the DPPG, DPLD coordinated these efforts, and in late 1986 began issuing guidelines for compiling the printed reports.<sup>3</sup>

The staff designed and tested a number of 1990 prototype data products based on the statistics from the 1988 dress rehearsal censuses. The electronic products allowed users to familiarize themselves with the 1990 tape formats and write software before they received the actual 1990 public-use files; the printed reports made it possible to test the Bureau's publication system. DPLD followed a similar pattern for 1990 census maps and other geographic products where timeliness was considered to be the "overriding concern."

The steps generally followed for deciding on the 1990 data products—subject, of course, to resource constraints—were as follows:

1. POP and HHES Divisions make proposals.
2. All the participating divisions review these.
3. DUSD sends the reviewed proposals to key data users for comment. It also asks selected user groups, such as the APDU 1990 Census Working Group on Census Products, the State data centers, and so forth, to review the proposed specifications.
4. POP and HHES summarize their responses together with those from the Data Products Working Group and prepare the final specifications.
5. DUSD announces the availability of data-product specifications in its newsletter, *Census and You*, for any users that might want table outlines or tally matrices.

This process got underway in the fall of 1988, beginning with the specifications for the summary tapes, as they were needed for the prototype 1988 dress-rehearsal products.

**Adjustment issue**—A consideration always looming in the background of the entire census was the possibility that the counts would have to be adjusted for under- and over-counting. When the Secretary of Commerce decided in October 1987 that they would not be, the City of New York

<sup>1</sup>The Decennial Planning (DPLD) and Decennial Operations (DOD) Divisions merged to form the Decennial Management Division (DMD) in June 1992. The pre-1992 division names have been used in this chapter.

<sup>2</sup>The DPPG later became the Data Products Steering Committee (DPSC).

<sup>3</sup>See 1990 Decennial Census Data Products Planning Memorandum Series, No. 4 and following.

and others filed suit in November 1988, seeking a court-ordered adjustment of the 1990 census counts. The plaintiffs charged that an inaccurate census undercount would unnecessarily distort the apportionment of legislatures, the allocation of the Electoral College's membership, and distribution of funds. In accordance with a court stipulation and order signed in July 1989, the Department agreed to reconsider the issue and to release corrected counts no later than July 15, 1991, if the Secretary decided to adjust them. (See ch. 12 for discussion.)

Given this deadline, DPLD's interdivisional Data Products Steering Committee recommended in November and December 1989 the logistics for processing (or reprocessing) the 100-percent tape. In the event adjustment was ordered, STSD would have to deliver to DOD a national file containing the adjustment factors no later than May 20, 1991, so that adjusted redistricting files for States could be released by July 15. More time would be needed to redo summary tape file (STF) 1A (by then, already issued) and other products. For example, the Geography Division would have to redefine urbanized areas (UA's—used for program funding) based on the adjusted data. Among other possible considerations was the manner in which sample data would be processed for the special nonhousehold-population category that adjustment would require: Namely, impute sample data for the entire population in that category and tabulate this population in the sample data products with the weight of 1. The observed sample population thus would be weighted using unadjusted 100-percent data for the control counts and the corresponding sample data (created by imputation) from the special category would be added to that.<sup>4</sup>

The Commerce Department and the Census Bureau considered two options for presenting count adjustments in the published reports. The first, called the "Current Proposal," included the words "count adjustment" with the data if the count had been adjusted, but with the data blank if it had not. The second option, called the "Double Version Approach," had the words "count adjustment" (if done) with the data, but those words would be taken out of the columns and rows of figures. The rows, but not the columns, would be respaced if the count was not adjusted. The Under Secretary for Economic Affairs chose the second option as the one preferable, whichever way the adjustment decision went.<sup>5</sup> Meanwhile, any 1990 census data products, including those for redistricting, released in advance of the Secretary's decision would contain a qualifying statement:

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 15, 1991.

<sup>4</sup>1990 Decennial Census Data Products Planning Memorandum No. 21, Mar. 9, 1990.

<sup>5</sup>Memorandum, Michael R. Darby to Barbara Everitt Bryant, Feb. 15, 1990; see also preceding correspondence.

**Disclosure avoidance**—User comments led to a change in the way the Bureau handled the issue of disclosure avoidance in the 1990 publications. For 1980, the staff had used a technique called "suppression," in which data—beyond population and housing-unit counts—were not published for any area that did not contain a minimum number of persons, households, or housing units, because doing so might disclose the identity of a particular one. In addition to the "primary" set of suppressed data, "complementary" suppression sometimes was necessary so users could not derive the suppressed primary values by subtracting unsuppressed values from totals. (In such cases, the totals were aggregated in such a way that the data would be complete at higher geographic levels.) Users wanted more complete detail and the Bureau cast about for methods of protecting confidentiality that would allow more publication than suppression did. Accordingly, it established an interdivisional "disclosure avoidance working group," which, in turn, in 1985-86, set up a subgroup to consider alternatives for both 100-percent and sample data. This subgroup, which included members of the tabulation and publication systems staff, examined three basic concepts of disclosure avoidance: Perturbation (random, or controlled to a subset of the data), rounding (treated similarly), and suppression (applied to areas, data universes, matrix stratifiers, individual cells, or combinations of these approaches).

By early 1987, the focus had narrowed to random rounding, but in May 1987—mainly because random rounding would result in different figures for the same data—the subgroup turned to a newly proposed method of matching and data interchange. This procedure, which would be applied to a sample of individual household records from the internal 100-percent data files, would match household records in different geographic areas, using specified control items, and then interchange the 100-percent person and housing-unit data for these household records. This method would leave certain controlled characteristics unchanged.<sup>6</sup>

In April 1989, a separate method, called blanking and imputation, was recommended to protect sample data from disclosure. This procedure, which would be implemented on a subset of individual household records from the internal sample data files, would blank a subset of the sample data items on these household records. Responses to the data would be imputed, using the same imputation<sup>7</sup> procedures as for unanswered data items.

Each of the two procedures would be applied to the respective detail file prior to its delivery for any tabulation, so that the tabulation/publication system could be designed

<sup>6</sup>1990 Implementation Plan—Decennial Tabulation and Publication System, III-2, Oct. 1, 1987, Public Law 94-171, which specified the data to be furnished for redistricting (see p. 13), did not allow masking of race data, so "noise" techniques such as controlled rounding could not be used.

<sup>7</sup>"Imputation" was the term the Bureau used for any situation in which missing data for a person and/or housing unit (HU) were assigned a response value. In "hot deck" imputation, the value assigned was based on responses from another HU and/or person to the missing value for the HU and/or person in question. In "cold deck" imputation, the missed data item(s) were filled with a prespecified value based on historical data patterns or values.

without concern for data suppression or rounding. STSD devised a prototype system for testing and evaluating tallies following the implementation of each one of the two procedures.

The Bureau adopted both of these procedures for 1990 and called them the “confidentiality edit” (see ch. 8 for further discussion).

## Tabulation and Publication Systems

Bureauwide research of new methods and techniques for 1990 data-product production began in 1982. A staff report in August 1983 defined the requirements for a publication system and led to procurement of some of its components. The Decennial Operations Division (DOD) had prime responsibility here. Meanwhile, research and development continued on this system, which was to meet the product requirements for the 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands. (The Bureau’s International Statistical Programs Center (ISPC) processed the data from Guam and other outlying areas (American Samoa, the Commonwealth of the Northern Mariana Islands, and the Republic of Palau) for publication. See ch. 13.)

The system had to do the following:

- Tabulate 12 billion cells of data.
- Create 500,000 publication-quality pages.
- Create 85 billion cells of data on 1,600 original public-use tapes for nearly 28 million geographic areas.
- Create 40 million frames of data on 200,000 original microfiche (the issue of CD-ROM had not risen yet).

(These gross estimates were for standard products, and did not include things like subject reports, or user-defined or other reimbursable tabulations.) The large-file processing (tabulation) would be done on the mainframes or a “family” of mini- and micro-computers working together, while a microcomputer network would deal with specifications and related processes. As yet, there was no single system for doing everything.

**Specification system**—Between 1982 and 1985, DOD staff and other reviewers decided that the development of specifications for 1990 had to be automated. Heretofore, this was a person-intensive, redundant process, starting either with pen-and-ink markups of the previous decade’s statistical tables or newly typed proposals, and continuing through rounds of manual review and correction. Research into new technology led to an interactive data base system which captured specifications—the parameters for code generator programs. These programs created the software necessary for tabulations, summarizations, extractions, and table symbolics needed for printed reports, as well as some of the documentation needed for user tapes. Subject-matter divisions would use the system to enter the specifications for the tally and summary files and the information necessary to produce printed reports.

Once a component prototype of a 1990 printed report and guidelines for microfiche and public-use tapes had been decided upon, DOD proceeded to design the data-product specification system (DPSS), which consisted of a series of interrelated data bases that were cumulative and reusable.

The system “captured” component data from three dictionaries—tally, table, and table extraction—and two driver files. Subject-matter divisions interactively entered new components into the first three dictionaries or selected existing components from the tally or table dictionaries to define a tally matrix or statistical table. For tabulations, the tally dictionary components provided the wording for strati-fiers (variables), universes, and attachments. The table-component dictionary contained the wording for head-notes, area designators, and stub and boxhead components. Each component in a given dictionary had linkage to supporting components in the others, through the name of the component. Once created and cleared for production, they could be used over and over without repeating the review and clearance process.

The DPSS had an auxiliary system that automatically created a table matrix section for DUSD’s tape technical documentation, and created and formatted statistical table shells. DPLD developed software to define boxheads and folio lines, and to precompile and upload base table images through TIPS II processing (see p. 7) without individual table coding.

The system was expected to generate 3,000 base-table images and tables and 35,000 unique cells of statistical data to support the overall product workload. With several of the dictionaries already in place, DOD began preproduction testing for tape products in the fall of 1989 and in the winter of 1989-90 for the printed reports.

**Tabulation system**—This was an automated general-purpose software system tailored to the specific requirements for 1990. It interacted with the specification system to determine which data to tabulate and what geographic levels to summarize them to.

The tabulation shell program consisted of input, output, and error-checking routines and the appropriate data dictionary for the file to be tabulated. There was information specific to stateside 100-percent and sample data, Puerto Rico 100-percent and sample data, and Virgin Islands data. This program contained everything necessary to provide base-level tabulations for an entire product line except the FORTRAN source code (called a “source code tabulation recode” in DOD) that generated the statistical data for each cell defined in the tally specifications.

As the subject-matter divisions generated new tally components, the DPSS (see above) indicated that a new component existed and that a FORTRAN code was needed to tabulate it. The tabulation system staff then generated and tested such a code and, when proven correct, certified it as a tabulation recode and entered it in the recode dictionary. With the appropriate recodes in place, the shell program generated the executable software for the base-level tabulations.

The base-level tabulations were the statistical data cells at the lowest level of geography required for the product line, such as county, block group, or tabulation block. DOD generated these tabulations in a production mode on a State-by-State basis. Once these were completed, the data could be summarized to the geographic levels appropriate for the product. In most instances this could be done once a State's tabulations were complete, although sometimes there had to be base tabulations for a group of States. For a U.S. summary, all the States' tabulations had to be done.

DOD had a parameterized summarization system that dealt with the decennial census geographic hierarchies. Generally, there were a series of subroutines unique for either a summary level or a summary-level series. These subroutines worked on a skeleton of geography available to the tabulation system. Based on parameters (hence the name) that specified the summary level required, the system selected one or more subroutines to sum the data cells to the appropriate geographic levels. Then, the process verified the summary and added geographic information, such as area names, to the file. Product lines such as summary tape file (STF) 1 required summarization of nearly 11 million areas to higher-level geography.

Finally, this system provided standardized software for preparation of public-use tapes (sometimes referred to as "user tapes"). The user-tape subsystem contained entry points to add coding for—

- Deleting extraneous data (e.g., race iterations, where no person of the race was present).
- Deleting (blanking) data cells, i.e., those originally specified as "count adjustment" were changed to blanks on the public-use tape.
- Computing and inserting means, medians, ratios, and other derived numbers into the file. This step used standardized computation subroutines, but required custom coding to accommodate the source of the data and products that a sponsor would have to review. The tally system used the driver to define the specific locations of data cells, block and record lengths, and geographic content on all public-use tapes.

Entries into the specification system determined the table-extraction components for the reports. When the subject-matter analyst defined the report contents, he/she would define the table extraction—the relationship of the tally and table components. The DPSS also captured the geographic requirements. Applied to the summarized file, the extraction process produced the data for a publication report. Those data, merged with the appropriate base table images, resulted in the statistical table portion of a printed report series (see p. 10), which consisted of textual layouts merged with the data tables.

The tabulation system used resource-conservation measures, particularly in the intermediate processing stages, such as temporarily excluding areas with no housing units or group quarters, and compressing zeros out of the intermediate files.

To verify the accuracy of the tabulated data, DOD's Tabulation and Publication Staff (TPS) developed a checkout data base system. Via software, each data product's information was matched to the data base, which was initialized (i.e., set up) with data from the analyzers (see n. 13) that the subject-matter analysts had reviewed and cleared. As new data were created and cleared for release, the checkout data base was updated with that information and maintained at the State level. This system assured data consistency and substantially reduced (over 1980) the time required to clear a new tabulation. Only new components and those that did not match to data in the data base required review.

**Printed report system**—In the summer of 1988, the staff decided not to use the 1980 decennial composition system (DCS) for the 1990 publications, and adopted the computerized **table image processing system (TIPS) II**, already in place for the 1987 economic, agriculture, and governments censuses. TIPS II was a "front end" set of computer programs for photocomposing publication tables that consisted of (a) textual stubs and boxheads and (b) data. TIPS II merged the numerical data with appropriate base table images, resulting in the formatted statistical tables for the printed reports.

The **census electronic publishing system (CEPS)** in APSD accepted manuscript in electronic form for text and charts and composed the textual materials in the printed reports and technical documentation.

The **electronic graphics system (EGS)**, also in APSD, prepared product components such as graphs, logos (logotypes), and covers.

A fourth necessary component for practically all of the publications was the Geography Division's **TIGER** (Topologically Integrated Geographic Encoding and Referencing) **System**. This was the automated source of the geographic reference files that had the tabulation geography names and codes for data tabulation referred to above, and also for the maps that accompanied or were part of the various printed data products. The TIGER System prepared summary-level files that contained area measurements and internal points, geographic headers, and other geographic information for entities that had separate records in the STF's.

Use of the three publication systems is discussed further on page 10; chapter 3, "Census Geography," describes the TIGER System.

### Creation of Edited Detail Files

Two DOD staffs (Processing Systems (PSS) and Tabulation/Publication (TPS)) worked with the subject-matter divisions to write specifications for, and create two computer files from the data collected during the census, a 100-percent edited detail file (HEDF) and a sample edited detail file (SEDF), for each State and the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. The

HEDF contained the edited data collected from the total population, while the SEDF had the edited and weighted data collected from a sample of households and group-quarters (GQ) populations.

DOD tested and modified software during and after the 1988 dress rehearsal, as needed, and had the final HEDF specifications and software for the stateside HEDF in place by November 1990, when HEDF processing was to begin.<sup>8</sup> SEDF specifications and software had to be final by June 1991, so that DOD could begin processing the SEDF's when the final, organized sample-data capture files (including the results of sample automated coding) were to be ready.

**HEDF**—The creation of the HEDF depended on the completion of all field and processing operations that involved the identification of housing units and/or persons included in the census. The field operations (see ch. 6) included all those activities associated with identifying the census universe and collecting data from it, such as nonresponse and field followup. Post-census coverage-improvement activities, including local review, also added units to the universe. The final field operation in 1990 was the "block split." Each housing unit (HU) or group quarters (GQ) located in a block split by a tabulation boundary was assigned an alphabetic code associated with the correct tabulation entity. This created the link needed to convert HU's and GQ's from their collection geography to their tabulation geography. The processing operations (see chs. 7 and 8) included all those activities associated with capturing the data collected in the field. Primarily, this meant FOSDIC<sup>9</sup> data capture, but also keying of forms collected from the GQ population, the written responses to the race item on all questionnaires, and those coverage-improvement operations collectively known as "search/match."

Once these activities were completed, the first step was to link the address control file (ACF), the identification number file (IDF), the data capture file (DCF), and the group quarters data file (GQF) to determine the final status and population count for each HU and GQ. After that, HEDF production continued in these steps:

- Create a "raw" HEDF with input from the IDF, DCF/GQF, and the written responses. Produce edit counts and data counts for analysts' review. The analysts used the edit counts to validate the race and age pre-edits and choose actions needed to repair "suspect" data.
- Apply edits for 100-percent items to the raw HEDF and produce the initial edited version. Produce counts for the allocation matrixes along with displays for validating the

edit specifications, including those for consistency.<sup>10</sup> Validate the file one last time with the geographic reference file codes (GRFC) to make sure the codes are the correct ones for the data.

- Apply the disclosure-avoidance procedure (see p. 5) to the edited file. To validate the process, have STSD review and approve the counts and displays.
- Forward the approved file to the TPS for further processing. Have subject-matter staffs clear editals<sup>11</sup> (by State and for the United States as a whole). The Population Division also used the approved file for its unpublished (off-line) reports. (This approved file was also referred to as the HTDF (100-percent tabulation detail file).)

HEDF production got underway in December 1990 and continued through February 1991; between January and March 1991, PSS gave GEO final population counts at the block level to determine the urbanized areas in the final publication geographic reference files (GRF's), and GEO delivered the final publication GRF's to PSS and TPS, by State, between April and July 1991.

When the HEDF was cleared as final, it became the source file for producing the P.L. 94-171 and STF 1 and 2 data products, and POP could use it for its errata system that kept track of errors or corrections that affected the counts for different geographic areas.

**SEDF**—The creation of the SEDF depended on the prior clearance of the HEDF, along with completion of keying and coding of the sample data items into a sample capture file (SCF). SEDF production followed these steps:

- Code the entries from the sample forms by a combination of computer and computer-assisted operations: First, create a person coding file (PCF) by matching the SCF to the DCF and identifying each person with sample write-in data. Then, extract files from the PCF for each of the three coding operations (listed below), on a flow basis:

**Industry and occupation (I&O) coding**—Assign three-digit codes to write-in responses to these items.

**General coding**—Assign three-digit codes to detailed items covering relationship, race, Hispanic origin, ancestry, and language.

**Place-of-work, migration, and place-of-birth (POW/MIG/POB) coding**—Add geographic codes to the write-in responses.

Then, match the coded files to the PCF to produce the file of persons codes (PCFX).

<sup>8</sup>Preproduction testing used 100-percent and sample detail files from the 1980 census for Montana and Virginia that were converted to resemble 1990 files. Production testing that followed (with "live" data from 1990) was broadened to cover detailed review of every product for six areas—New Jersey, Virginia, Montana, Vermont, Puerto Rico, and the Virgin Islands. The balance of the country constituted the "non-test States," for which the staff reviewed only a sample of the product components.

<sup>9</sup>Film optical sensing device for input to computers. This was an automated system that "read" microfilmed copies of the questionnaires and transferred the data from them to magnetic tape.

<sup>10</sup>A consistency edit modified person and/or HU data items that had invalid or inconsistent responses. The edit could include range checks and comparison of characteristics related to the data item(s) in question.

<sup>11</sup>Derived from the edited detail file, editals listed on a computer printout the total-count distributions and imputation information for each population and housing characteristic. POP experts used editals in checking the data from the edit/imputation application for reasonableness.



- Produce the unedited and unweighted sample detail file. Using the HEDF as the base for control counts, bring together the sample data from the DCF/GQF, the SCF, and the PCFX for sample forms and sample GQ persons. Augment the file with housing units, using 100-percent data only, as necessary to prevent large geographic-coverage problems in the sample universe. Produce counts and displays needed to validate the process.

Successful completion of these preliminary steps led to the next major activity:

- Perform the basic edit and allocation of the sample data, excluding the joint economic and POW allocation edits. Produce counts for (a) validating and analyzing the basic edit specifications, along with allocation counts and displays for (b) validating the allocation/edit specifications. Using the resultant output file, run special tabulations for (a).

(At any point in the review process, modification to the edit specifications could be requested due to observations of the actual data or the edit process.)

- Weight the sample data. Using the 100-percent characteristics from the HEDF, produce weights for every housing unit and person contained in the sample file, plus sample persons in group quarters.<sup>12</sup> Link the weights to the edited sample file and produce the input file to the joint economic allocation process. Jointly complete allocation of all the economic variables and store the results in the sample edited file.
- Allocate the POW tabulation and collection geography codes, using detailed specifications from the subject-matter analysts.
- Produce the final SEDF after first applying a series of post-edit cleanup routines. Produce final edit counts (editals) by State and for the U.S. total. Produce displays of MIG and POW flows for analysis and validation by the subject-matter specialists.

(At this point, the staff detected some coding problems and file errors that were not discernible until the SEDF was tabulated and the analyzer<sup>13</sup> display was produced. The edit process was repeated for the State(s) requiring correction.)

<sup>12</sup>In general, the weighting procedure dealt with groups of records within specially defined "weighting areas" (using information from the final publication geographic reference files (GRF's). Within each weighting area, the staff obtained 100-percent counts and sample estimates for various characteristics. For each of these, the sample was weighted to agree with the 100-percent counts of the same characteristics (based on control counts and some characteristics (such as race and sex) from the HEDF) using an iterative procedure called "raking ratio estimation." This assigned weights to the sample records within each area.

<sup>13</sup>Derived from the edited detail file, analyzers showed on a computer printout data for population and housing characteristics, universes, and distributions at designated geographic levels. Subject-matter experts used the analyzers to review the reasonableness of the data in the edited detail files and to check data products throughout the tabulation/publication cycle.

## Report Processing

Once a State's (or equivalent) HEDF and/or SEDF had been accepted as final, its processing began for the various product lines.

**Public-use tapes**—For the summary tape files (STF's) and public-use microdata sample (PUMS) files, DOD employed a program called a "user tape generator" to produce master and backup user tapes on the Bureau's mainframe computer. The master tape went to storage and the backup tape to DUSD. Through a generator program on the mainframe and from there onto the microcomputer local area network (LAN), the material for the technical documentation (TD) to accompany the tapes came from the tally driver file. DUSD, after consultation with and clearance from the subject-matter divisions and DOD, produced and edited the TD in printed form. (The TD accompanied each order at no charge, or it could be purchased separately.) DUSD copied some tapes and sent others to a contractor for duplication. DUSD distributed the "sales" tape copies as needed to State data centers, census information centers, and the like, or to fill customers' orders. Virtually all the 1990 STF's were produced on 6,250-bpi reels (or IBM 3480-compatible cartridges) for mainframe computers in either EBCDIC<sup>14</sup> or ASCII<sup>15</sup> format. Customers could order 1,600-bpi tapes if they wished, however. Tapes/cartridges were priced either per reel or by the number of megabytes of data on them (with a minimum price for one reel). The STF's did not contain maps, but, with the appropriate software and TIGER or other compatible geographic files, they could be used in data mapping applications.

DUSD, responsible for PUMS distribution, prepared the record layout and the TD for the PUMS files. Beginning with approximately 17 million raw records in the tabulation/publication system (T/PS) detail file (from which the other sample-based public-use products came; see p. 7 ), DOD randomly selected, on a State-by-State basis, a stratified sample from the T/PS, following specifications from STSD. DOD applied geography from the respective 5-percent and 1-percent equivalency files and prepared housing and person records for all States for each sample. (Since the sample design for the PUMS was based on the full census sample for each State, the number of subsamples varied by State—anywhere from 12 to 26, instead of having 17 equal parts.) The staff merged all housing-unit and person records from five randomly selected 1-percent samples to make up the 5-percent PUMS. Another 1-percent sample was randomly designated as the 1-percent sample product. For the 3-percent "elderly" sample, DOD selected

<sup>14</sup>Extended Binary Coded Decimal Interchange Code, a character set designed originally for use with IBM (International Business Machines) computers.

<sup>15</sup>American Standard Code for Information Interchange, a code used in computers and communications systems in which each character, number, or special character was defined in eight bits.

only those housing-unit records with at least one person age 60 or over and included all other persons in the unit. A given household or housing-unit record would appear in only one of these samples.

As DOD prepared editals and analyzers (see n. 11 and 13), it produced other review products for these PUMS files, for participating divisions to review on the minicomputer system. At the same time, it gave DUSD a "finished" PUMS file that had been run through a "converter" program that changed or recoded individual records as needed to protect confidentiality or account for other differences from the STF's. DUSD checked the record counts to ensure that the files were complete. Following further review and any necessary correction, DUSD copied the tapes in either ASCII or EBCDIC (see notes 14 and 15) on reels or cartridges to fill users' orders.

**Printed reports**—Using the Bureau's mainframe computers and a LAN of microcomputers, DOD and APSD went through the following steps for each U.S., State, or smaller-area report. Most of these steps could be accomplished in a day, but where subject-matter review was necessary, as in step 3, a week was usual.

1. With an extraction program, obtain the data for the geographic level specified, including historical statistics.
2. Merge the data and base-table image files.
3. Produce tables on a laser printer for subject-matter review and clearance.
4. Prepare the table file in the format needed as input to the Government Printing Office's (GPO) VideoComp system.
5. Merge the text and table components into a "GPO file."
6. Electronically transfer the GPO file to GPO for processing on the VideoComp system and return to APSD in photographic negative form.

APSD prepared the text components on its Census Electronic Publications System (CEPS) and the graphic components on the Bureau's Electronic Graphics System (EGS), following the specifications already decided upon and tested during and after the test and dress-rehearsal censuses.<sup>16</sup> (The state-of-the-art CEPS and EGS had been used already for the 1987 Economic and Agriculture Censuses, replacing the manual typing and other operations.) The Geography Division (GEO) produced the maps on its electrostatic plotters (see below); APSD and the subject-matter divisions reviewed these maps in the form of laser proofs. When final, GEO submitted the finished negatives to APSD for insertion in the final publication package.

After steps 5 and 6, APSD checked the negatives for quality and removed the identification lines. When all the negatives were accepted and the final package was approved,

the Bureau issued a Publications Service Request (Form CD-10) that specified the number of copies, inks, size, binding, distribution, and so forth. This form and the package went to GPO together with any other specifications the printer might need.

### Printing Contracts

APSD procured the first of the 1990 census printed reports (prior to October 1991) through an existing GPO contract for miscellaneous publications. In the summer of 1991, APSD prepared a set of printing specifications and transmitted these to GPO through the Department of Commerce. GPO arranged for prospective contractors to bid on these and made a multiple award to five contractors for fiscal year (FY) 1992 (October 1991 through September 1992). This contract covered a possible 700 orders of 1,300 to 5,000 copies each; APSD placed slightly more than 150 orders. Except for a provision that multivolume reports were to be boxed, the multiple award and specifications for FY 1993 were basically the same as for 1992.<sup>17</sup> There were six contractors this time. In general, there was little need for press inspections because the publications were essentially in black ink on white paper, although APSD closely monitored the U.S. Summary reports as they contained four-color maps. When the Data Preparation Division (DPD) in Jeffersonville, IN, received the shipments for distribution and/or warehousing, its staff inspected the volumes for such defects as printing missing from the spines, loose binding, or pages out of order. GPO had the contractors replace pulled-back copies, but this was not a recurring problem.

In addition to selecting the contractor, GPO decided (in consultation with APSD) how many copies the Federal depository libraries would need and how many copies the Superintendent of Documents (SupDocs) would stock for sale, and determined the GPO stock number(s) and price(s). (For 1990, most stock numbers and prices were known in advance through negotiations between the Bureau and GPO; for 1980, GPO tended not to price reports until it knew the actual cost from the contractors' bid prices.) Most contractors were able to print the reports and have them in the SupDocs' and the Bureau's hands in about 45 days.

In many of the text operations described above, APSD had creation, production, and coordination roles, depending on what was being done. For example, the APSD programming staff wrote the table image processing system (TIPS II; see p. 7) software used on the Bureau's mainframe and minicomputers, trained DOD personnel in its use, created the link between TIPS and the CEPS (APSD's internal system), and was responsible for the programs for translating the TIPS production files to a format compatible for the Bureau's laser printers as well as the automated electronic file transfer system used between

<sup>16</sup>In the summer of 1987, DPLD decided that all of the 1990 census printed reports would be composed in a font called "Spectra." Its print size was slightly larger than the "Technica" font used for 1980, but the data loss per page was expected to be minimal. In 1989, however, this decision was reversed and the 1980 font was repeated for 1990.

<sup>17</sup>The Bureau rejected several reports and succeeded in obtaining some cost reductions, but these refunds only partially offset the expense of the quality-assurance program (not part of the contract) in Jeffersonville, mentioned below.

the agency and GPO. APSD participated in both production and coordination by shuttling the text back and forth among divisions (and with GPO) in its various draft stages, making requested corrections, adding graphics, etc. APSD wrote printing specifications, negotiated printing contracts (see above), and obtained clearances as needed from the Department of Commerce and GPO.

**Microfiche**—After having produced a limited amount of data on microfilm after the 1960 and 1970 censuses, the Bureau turned to microfiche for 1980 as an alternative, low-cost, space-saving medium for data users, particularly libraries. (The fiche were 4"x6" sheets of film containing up to 98 pages of printed or graphic material, easily read on inexpensive equipment, and capable of being enlarged and copied onto paper as needed.) Virtually all of the 1980 census reports issued on paper appeared on fiche, together with some of the tabulations produced as printouts from summary tapes. The population and housing *Block Statistics* reports (series PHC80-1) were printed only on fiche—not on paper. Commercial firms began producing and selling on microfiche census publications dating back to 1790.

During the decade following the 1980 census, micro-computers—with access to a variety of data bases—became commonplace in the user community, leading to greater interest in electronic, rather than printed, census data products. Accordingly, the Bureau generally limited fiche to copies of printed reports. For these, described among the other products listed in this chapter, DUSD reformatted the publication tapes into so-called "line printer files." DUSD sent these files, as needed, to the Department of Commerce's Office of Publications, where they were put through a COM (computer output on microfiche) machine. This equipment converted the information on the file to print images on a film negative. After development and quality testing for density, legibility, etc., this became the master fiche from which the Department produced copies as requested, with reimbursement under an interagency agreement. DUSD sold the fiche at a price based on the number of fiche ordered.

**CD-ROM**—CD-ROM was the acronym for "compact disc, read-only memory," an electronic medium capable of being used with a microcomputer. In 1986, the Census Bureau became the first Federal agency to create and distribute its own statistics on CD-ROM. The discs issued for the 1990 census were 4-3/4 inches in diameter and could hold 650 mb (megabytes) of data. To produce them, DUSD's Systems and Programming Branch (S&PB) obtained the summary tape files (STF's) as these were issued on nine-track magnetic tape formatted in ASCII. S&PB mounted this tape (modified if needed) on a special type of computer called a "CD publisher," and stored the files on its large-capacity hard drive. From the ASCII tape, the "publisher" created a dBASE III file, to the directory of which the staff added technical documentation and "read-me" and S&PB-written "menu-driven" software (so that the user would not need a separate program to search and read the disc). Utilizing

commercial CD publishing software, the S&PB staff indexed all the files in the directory and transferred them to another nine-track data-access tape (DAT) cartridge. That product was sent to the contractor, who created from it a CD-ROM master and made CD-ROM copies from that as the Bureau needed them for sales or other distribution, for example, to State data centers or census information centers. (GPO supplied them to Federal depository libraries.) S&PB took an average of 2 to 3 days per disc to prepare the necessary tapes or cartridges, and the contractor normally took 1 week to mass-produce the CD-ROM's.

**Online service**—In the early 1980's, the Census Bureau began exploring the idea of placing highlights of some of its published reports on national time-sharing services for access in a "full text" electronic publishing format by the general public, news media, and the like. These reports would include not only demographic census and survey statistics, but also data on a variety of economic topics, such as business, foreign trade, and agriculture. The Bureau would convert the reports to the appropriate machine-readable format, enter them directly into the services' computers, verify the entries, and replace them on a periodic basis. To access these reports, users would pay the customary fees charged by the organizations offering the service.

In the fall of 1983, the agency published a "request for information" (RFI) in *Commerce Business Daily*, to which several vendors of large-scale information systems responded with expressions of interest. Following negotiations, the Bureau signed an agreement in May 1984 with DIALOG, of Palo Alto, CA, and began transmitting data in July 1984 for a system called CENDATA. The Bureau registered this name as a trademark. Except for a brief period in the fall and winter of 1985-1986, when a banking conglomerate also received tabulations, DIALOG remained the only CENDATA™ vendor until March 1987, when CompuServe, Inc., of Columbus, OH, signed a similar agreement.

Basically, the arrangement was such that the Bureau could speedily disseminate its broad-ranging census and survey data in a standard electronic form and not devote resources to enhancing or developing additional products for customers. The vendors would add value by designing and supporting software, providing access to their own mainframes, marketing and processing data, and attending to systems development and maintenance. The Bureau controlled the CENDATA™ content and format, giving the vendors public-use tapes in ASCII format for their mainframe computers plus table outlines ("masks"), menus, technical documentation, narratives, and specifications for the topical areas and geography to be covered on each CENDATA™ tape.

For the 1990 census, the Data User Services Division, with primary responsibility for CENDATA™, extracted the appropriate tabulations from the standard public-use tapes, for example, STF's 1A and 3A, and sent the extract copies to the vendors. They, in turn, mounted these on their mainframe computers, from which they provided online

access to their customers, who would have mini- or micro-computers and modems. The offerings from the 1990 census included basic population and housing counts for States, counties, and places; data on race and Hispanic origin; and tabulations from STF's (e.g., for census tracts from STF 1), the P.L. 94-171 files for voting districts, and the entire EEO files.

The CENDATA™ service grew from a few thousand users with page-oriented word processors in the early 1980's to an estimated 50,000 users downloading some 396,000 files—principally onto personal computers—in calendar year 1992.

### Creation of Data Product Maps<sup>18</sup>

The maps the Census Bureau produced for public use, either separately or accompanying 1990 census tabulations, constituted fewer than 15 percent of the total number of mapsheets needed in the census, but accounted for more than 75 percent of the map types seen by the public and other users of decennial census data products. These product maps differed in several important characteristics from those needed to create the TIGER data base and the subsequent census data-collection activities (see ch. 3). The most important difference was that most of the data product maps were subjected to "interactive editing," and that required developing a map production system quite different from the one used for the field (data collection) maps. (Volume and time constraints in generating the field mapsheets—over 600,000 different ones in approximately 24 months—in a centrally controlled, single type of computer environment centered around a high-speed, low-resolution electrostatic plotter, precluded interactive editing while they were being produced. Further, the computer programs were designed for speed and simplicity, not for a polished, public-use product.)

For 1990, the Geography Division (GEO) prepared data product maps in two forms:

**Electrostatically plotted mapsheets** sold separately from the census statistical products (e.g., summary tapes, compact discs, tract/street indexes, or printed reports for census tracts and block numbering areas). These were monochromatic (black and white), and produced without interactive editing. (Computer programs made the cartographic decisions in the Bureau's 12 regional facilities.)

**Film negatives** used to make printing plates for published reports. Some of these maps were monochromatic; others, notably the thematic ones, were multicolored. Virtually all were of high image quality and interactively edited by cartographers. Some of the thematic maps were of the "stand-alone" type that could be sold separately.

All of these maps came in three standard sizes:

Page size—approximately 8-1/2" x 11"

Two-page size—approximately 11" x 17"

Full size—up to approximately 36" x 46"

Geographic coverage (the areal extent of the geographic entity being mapped) varied among the individual map types. The entire United States was the mapping entity for most of the thematic maps. Alaska and Hawaii generally were shown as insets when the Nation was the mapping unit. The State, county, urbanized area (UA), and American Indian/Alaska Native area (AI/ANA) were the levels of 1990 census geography that served as the mapping entities for the remainder of the summary reference outline maps.

Data product map scale depended on the parameters of sheet size, geographic coverage, and map content. The thematic maps were usually at a small scale and included only a limited number of boundaries and names for reference. Except for very large bodies of water and foreign land, they typically did not show other traditional cartographic base features.

Similarly, most of the small-scale summary reference outline maps, such as the State/county outline map, displayed only a few levels of 1990 census geography. When these did appear, they generally were limited to those coincident with the displayed geographic entity boundaries to assure proper orientation for the user. Large- and medium-scale summary reference outline maps portrayed a wide variety of 1990 census geographic entities; some of these, like the county block maps, included detailed cartographic base features.

**Publication map production**—This involved operations on different hardware "platforms" (see fig. 1)—mainframe, workstation, and mini- and micro-computers, along with output devices, such as electrostatic plotters in the regional census centers and the Data Preparation Division (DPD) for data-collection maps and selected summary reference outline maps, such as the county block maps. For the maps in the printed reports, the Bureau used the U.S. Geological Survey's high-resolution raster plotters to produce film positives. Staff made negatives from those to be used in printing.

The mapping systems used to produce the maps printed in the reports employed a series of program modules linked together to generate a new map output format, the map image metafile (MIM). Based on the map requirements, the cartographer chose either a noninteractive production process or one that allowed interactive editing of the MIM's. The MIM's served as a common exchange medium among different production modules. The cartographer could select and merge two or more maps (MIM's) onto a single metafile (page).

There also were "map specific" metafiles that were unique to a particular type of map. By comparing the available metafiles with the map requirements, the cartographer could select those needed for production, taking

<sup>18</sup>The paragraphs that follow are based on Frederick R. Broome and Leslie Godwin, "The Census Bureau's Publication Map Production System," *Cartography and Geographic Information Systems*, vol. 17, No. 1, Jan. 1990, pp. 79-88.

into account map scale and inset requirements and any updates to the TIGER data base since those metafiles had last been used.

The system's interactive edit module allowed the cartographer to improve the map design and the readability of the computer-generated images, including its symbology and color, while creating the map's output (plot) file on his/her workstation screen. The module had built-in parameter checks to make certain that predetermined specifications for the map's objects or functions were not violated. Thus, the cartographer moved names or altered symbols to avoid overprinting and improve map readability without affecting the accuracy of the data.

## Area Measurement

The Census Bureau provided area measurement information for virtually every type of geographic entity, including census blocks, in the standard data products for the 1990 census, both published reports and computer files. This information made it possible to determine population and housing density in the census (users might have other applications). The 1990 census also gave a total water area figure (but separate figures only on the TIGER/GICS™ (see p. 26)) for inland, coastal, Great Lakes (including Lake St. Clair), and territorial waters.<sup>19</sup> By reflecting all water—not just inland water, as in earlier censuses—the total area reported for coastal and Great Lakes States increased substantially.

**Historical background**—Once in 1850, and regularly since 1880, the decennial censuses reported area measurements for large geographic entities, such as States and counties. The first major effort to determine areas for county subdivisions and incorporated places occurred in conjunction with the 1940 census; the staff also used these figures to verify the county areas. They used data from States and local governments, supplemented with planimeter readings, to measure areas manually on the most accurate maps available. County figures, however, were adjusted to previously determined State totals; where county figures were revised “to fit,” so were those for the county subdivisions.<sup>20</sup> The Bureau held to these rules for the 1950 (when the census first reported measurements for metropolitan and urbanized areas), 1960, and 1970 censuses, revising figures only to take into account new entities, new reservoirs, better maps, and obvious errors and inconsistencies.

<sup>19</sup>“Inland water” consisted of (1) lakes, reservoirs, ponds, and similar bodies, and (2) rivers, canals, etc., as well as estuaries, bays, and the like, from the point furthest downstream at which they appeared as single-line rather than double-line features in the TIGER file (the Bureau's geographic data base for 1990). “Coastal water” was located within embayments separated from territorial water by widths of 1 to 24 nautical miles. (Prior to the 1990 census, areas of many large water bodies, such as the Chesapeake Bay and Puget Sound, were shown separately.) “Territorial water” comprised all water between the 3-mile limit and the shoreline or the base lines that delimited inland and coastal waters.

<sup>20</sup>U.S. Bureau of the Census. Sixteenth Census of the United States: 1940. *Measurement of Geographic Area*, by Malcolm J. Proudfoot. [Washington, DC: Government Printing Office, n.d.], p. 27 ff.

For the 1980 census, the GEO staff recalculated the area of every State and county by reference to the largest-scale topographic quadrangle maps available from the U.S. Geological Survey (USGS), usually the 1:24,000-scale series (but 1:250,000 for Alaska). The area covered by each map, which varied with latitude, was a known quantity. Thus, each provided both the building blocks to determine the areas of large counties and the control for the results of measuring (by electronic planimeter) the county areas of multicounty maps. That is, the results were adjusted to sum to the known total of each quadrangle. For those places and, in selected States, county subdivisions with a population of at least 2,500, the Bureau used local maps and other information to determine the area, which also was controlled against the total map area.<sup>21</sup>

**The 1990 census**—For 1990, the GEO staff calculated area measurements by computer, based on the information contained in a single, consistent data base—the TIGER file (see p. 25)—rather than relying on manual measurement of a variety of maps supplemented by historical and local information. The TIGER file, in turn, was based on the USGS's 1:100,000-scale maps for the contiguous 48 States, except for the metropolitan areas already covered by the GBF/DIME (geographic base file/dual independent map encoding) files in the 1980 census.<sup>22</sup> Calculations for Alaska, Hawaii, Puerto Rico, and the outlying areas were from manual digitizing, primarily of various-scaled USGS maps. (By integrating all of these map sources into the single data base, coastlines and inland bodies of water were apt to be more current and accurate.) The 1990 census measurements superseded all previous data.

## 1990 CENSUS REDISTRICTING DATA PROGRAM

### Background

This activity, also known as the “Public Law (P.L.) 94-171 Program,” had its origins in that congressional legislation, which amended Title 13, United States Code (specifically Section 141(c)), in late 1975. This law required the Census Bureau, within a year after Census Day, to furnish each State with a set of population tabulations, by State-specified geographic areas, for determining congressional, State, and local legislative boundaries.<sup>23</sup>

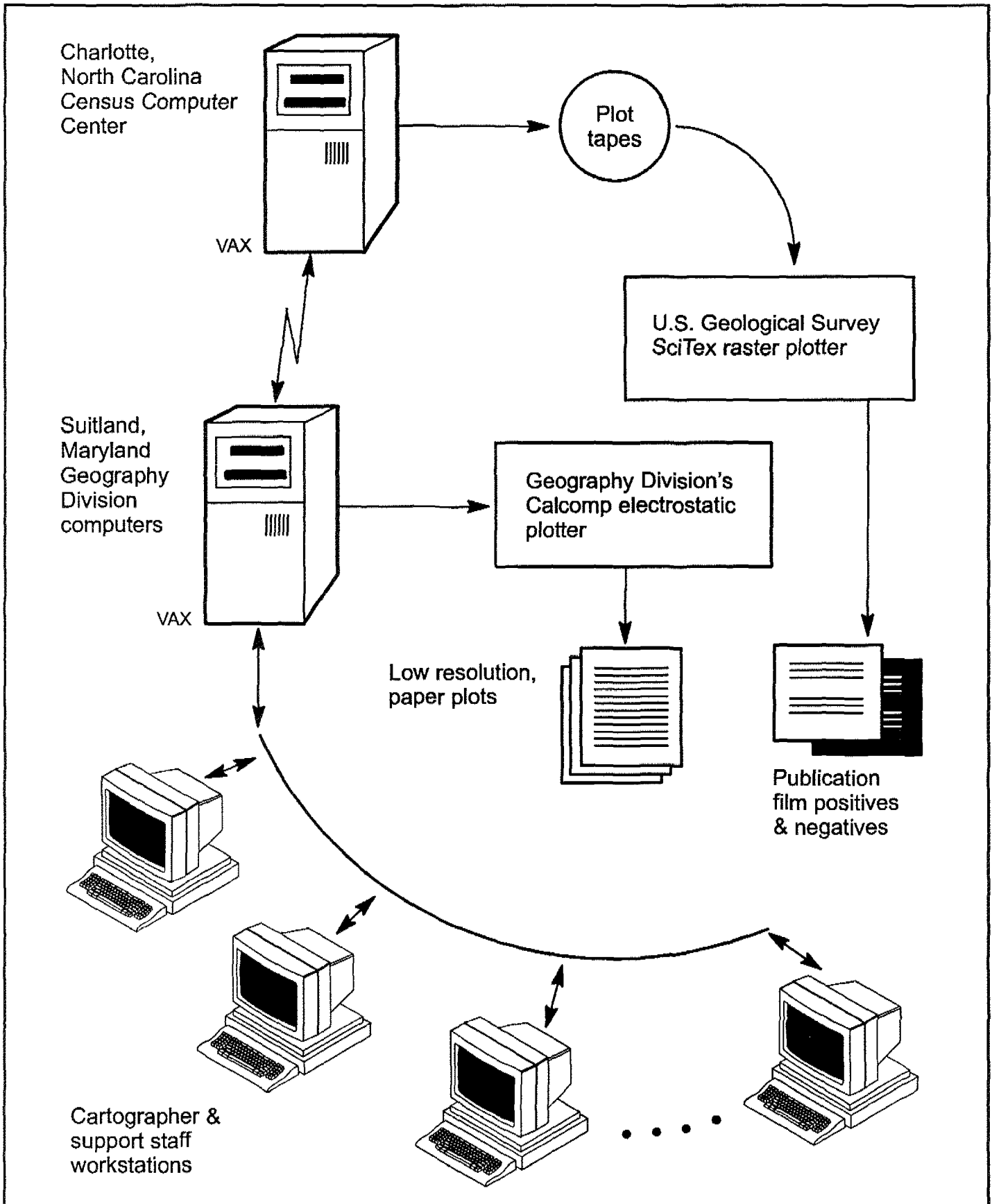
P.L. 94-171 grew out of State legislatures' frustrations when they attempted to follow court mandates for drawing legislative districts with population sizes that were as nearly equal as practicable. Specifically, many States found that when they tried to fit the 1970 small-area population counts (for blocks and enumeration districts)

<sup>21</sup>U.S. Bureau of the Census. 1980 Census of Population and Housing: *History*, PHC80-R2-A (1986), ch. 3.

<sup>22</sup>*Ibid.*

<sup>23</sup>For further background on P.L. 94-171 and the program in the 1980 census, see 1980 Census of Population and Housing: *History*, series PHC-R-2, ch. 8, p. 29.

Figure 1. The 1990 Census Publication Map Production System Flow



Note: Arrows represent metafile flows except where plotting is indicated.



into legislative districting proposals, the census units' boundaries crossed those of the election districts that were their "building blocks." As a result, States worked for passage of a bill that would require the Bureau to recognize their precinct/voting district lines when it bounded the smallest geographic units in the decennial census.<sup>24</sup> Even before P.L. 94-171 was signed, however, the Bureau began consulting with the National Legislative Conference's Reapportionment Committee and State officials to find a way to provide block and precinct head counts from the 1980 census.

Twenty-three States participated in the 1980 Census Redistricting Program. Evaluation of that program at a national meeting of State officials and other stakeholders in 1983 led to a decision on the part of the Bureau to provide block-by-block counts for the entirety of each State in 1990 and to permit the States to suggest visible ground features as the boundaries of these blocks.

### Preparations for 1990

After tests with several States in 1984-85, the Bureau wrote a formal letter to elected officials in all the States. This letter announced the 1990 program and invited them to participate in phase 1, the "Block Boundary Suggestion Project." During 1985 and 1986, official representatives from 38 States visited Census regional offices and designated to the regional geographers the physical features shown on USGS quadrangle or other base maps they wished to be "held" as block boundaries for the 1990 census tabulations.

In 1987, following the conclusion of phase 1, the Bureau invited all the States to join phase 2, the "Voting District Program," which began in April 1989. In phase 2, the regional census centers (RCC's) shipped two sets of the computer-drawn county block maps for 1990, as they became available, to the States, with the last maps shipped in June 1989. States had 7 months from the receipt of these maps to return to the RCC one set, with their voting district boundaries marked in the form of whole, contiguous census blocks. The regional geographers then reviewed the delineations to be sure that the States had not "split" any blocks and had otherwise followed phase 2 guidelines. Bureau staff added the voting district boundaries to the TIGER file for tabulation purposes. Forty-six States participated in phase 2; Mississippi, Montana, Oregon, and Kentucky did not. The District of Columbia and Puerto Rico, while not covered under P.L. 94-171, also submitted marked maps.

In a series of workshops in 1989 and 1990, Bureau staff, in cooperation with the National Conference of State Legislatures (NCSL), briefed State officials on the 1988 census dress rehearsal (Boone County, MO) P.L. 94-171

test data, redistricting case law, census geographic and subject-matter terminology, and other reapportionment information. The staff also conducted mapping workshops in the phase 2 States.

Aside from continuing contacts with State officials, the NCSL's Reapportionment Task Force, and the American Legislative Exchange Council's State Affairs Committee, Bureau staff members also briefed other groups and organizations that had a stake in the redistricting process. These included the following:

- White House Office of Intergovernmental Affairs
- Cabinet Departments' intergovernmental affairs officers
- Department of Justice—Civil Rights Division
- Congressional Black Caucus
- Democratic National Committee
- Republican National Committee
- Mexican American Legal Defense and Education Fund (MALDEF)
- National Congress of American Indians
- National Puerto Rican Coalition
- National Republican Legislators Association
- National Democratic Legislators Association
- National League of Cities
- National Association of Counties
- National Black Caucus of State Legislatures
- 1990 Census Advisory Committees

### Delivery

The Governors and legislatures (or other official bodies responsible for redistricting/reapportionment) each designated an official recipient for the P.L. 94-171 products. Between January 14 and March 8, 1991, the Bureau shipped to the designated officials (regardless of political party) in all 50 States and the District of Columbia population counts on computer tape and paper, together with maps. The District, Puerto Rico, and the 46 States that had defined election precincts or voting districts received materials reflecting that level of detail; the tabulations and maps for the other 4 States were by census block. In all, the deliveries covered 7 million census blocks and over 170,000 precincts. The population counts were for the total population and persons 18 years of age or older (i.e., voting age), and population distributions by race and Hispanic origin. The housing counts (on the computer tapes only) were the total numbers of units. (In response to users' requests, the Population Division released diskettes and a special computer-tape file, STF-S-1, that contained total housing units, vacant housing units, total population, and group quarters population, coincident with the P.L. files, but did not identify or include election precincts or voting districts.)

The tabulations for Puerto Rico, where the census did not collect data on either race or Hispanic origin, were completed in July 1991 (along with maps).

The Bureau issued all the stateside P.L. 94-171 statistics on a series of 10 CD-ROM's about 3 weeks after the tapes had been delivered. Data users who wanted P.L.

<sup>24</sup>See National Legislative Conference Reapportionment Committee. *Improving the 1980 Census* [Report to the U.S. Congress]. Lexington, KY: Council of State Governments, 1974.



data on paper with just higher-level geography (States, counties, MCD's, and places) could obtain summaries from the 1990 CPH-L-2 series, which DUSD published on demand on a cost-reimbursable basis. A similar arrangement was available in the 1990 CPH-L-3 series, where users could order tabulations for census tracts/BNA's and/or blocks. CENDATA™ (see p. 11) offered substantial P.L. 94-171 table extracts online.

## Evaluation

In late 1991, the Bureau's Redistricting Data Office asked each Governor and the majority and minority leaders of each State legislature and their key staff members to comment on a draft "issues and alternatives" document concerning the 1990 census redistricting data program and make suggestions for the comparable 2000 program. The NCSL Reapportionment Task Force discussed these and other responses at NCSL meetings in Kansas City, MO, on May 29, 1992, and Cincinnati, OH, on July 31, 1992, and at a further task force meeting in Raleigh, NC, on November 14, 1992.

The consensus was that the 1990 program met the legislative needs and should be continued intact (with state-of-the-art enhancements for 2000), especially the phase 1 Block Boundary Suggestion Project and data delivery on paper, tape, and CD-ROM (preferably all three at once). The States generally concurred that the Bureau needed a better way to notify them of corrections to governmental unit boundaries, perhaps electronically. Several States wanted data for new tabulation blocks or blocks split during the census in areas of sudden development, or where large military reservations (for example) might need to be subdivided legislatively to balance district populations. There were a number of recommendations for refining the paper maps and the TIGER/Line® files.<sup>25</sup>

## SERIES DESCRIPTIONS

The Census Bureau published data and other information, including maps, from the 1990 census in a variety of media—printed reports, microfiche, and in electronic form. For the dates when the Bureau or the Superintendent of Documents released individual reports in the principal series (identified with an asterisk (\*) below) by number of pages/fiche/tape reels/megabytes and original price, see appendix 10A.

## Final Reports (Printed)

Printed reports containing final 1990 census data were issued in paperback series described below (with appropriate maps; see "Maps in Printed Reports" below). There

<sup>25</sup>U.S. Bureau of the Census. *P.L. 94-171 Redistricting Data From the Year 2000 Census: The View From the States*. Washington, DC: Government Printing Office., 1993.

were no hardbound volumes. All reports for Puerto Rico were in Spanish as well as English.<sup>26</sup>

In those series with reports numbered 1 through 55, No. 1 was the U.S. summary; 2 through 52 were for the States and the District of Columbia, in alphabetical order; 53 and 55 were used for Puerto Rico and the Virgin Islands, respectively, while 54 was skipped.

The reports and other data products for Puerto Rico, the Virgin Islands, and the Pacific outlying areas are mentioned only briefly below. For more detailed information on them, see chapter 13, which describes the 1990 census operations in those places.

## Population

**\*1990 CP-1 (-1 through -55), *General Population Characteristics***, contained detailed 100-percent tabulations on age, sex, race, Hispanic origin, marital status, and household relationship characteristics for States, counties, places of 1,000 or more inhabitants, minor civil divisions (MCD's) of 1,000 or more inhabitants in selected States, State parts of American Indian areas (AIA's), Alaska Native areas (ANA's), and summary geographic areas such as urban and rural.

The comparable 1980 data came from (1980) series PC80-1-B, which had the same title, but included geographic areas that crossed State boundaries, delaying publication for some States. Accordingly, the Bureau split the series into parts for 1990, with the first part as described above, and the others as three single reports, as follows: 1990 CP-1-1A, *General Population Characteristics for American Indian and Alaska Native Areas*, displayed data for AI/ANA's—American Indian reservations, trust lands, tribal jurisdiction statistical areas (TJSA's) in Oklahoma, tribal designated statistical areas (TDSA's), Alaska Native village statistical areas (ANVSA's), and Alaska Native regional corporations (ANRC's). This report showed AIA totals, whereas only their State portions appeared in the CP-1 State reports. (ANA's did not extend beyond Alaska.) 1990 CP-1-1B, *General Population Characteristics for Metropolitan Areas*, presented tabulations for the individual MA's and their component areas. Where State boundaries split metropolitan areas, there were summaries for the parts as well as the whole. 1990 CP-1-1C, *General Population Characteristics for Urbanized Areas*, had data for individual urbanized areas (UA's) and their component areas; where State boundaries split them, there were summaries for the parts as well as the whole.

**\*1990 CP-2 (-1 through -55), *Social and Economic Characteristics***, focused on the population subjects for which the census collected data on a sample basis. There were cross-tabulations of both the 100-percent and sample data collected on the sample (long form) questionnaire.

<sup>26</sup>The volumes had double covers, one cover with text and tables on both sides of the pages in one language. The user then could turn the volume over to the other cover and read the same material in the other language.

The reports showed statistics for States (including summaries such as urban and rural), counties, places of 2,500 or more inhabitants, MCD's of 2,500 or more inhabitants in selected States, the State portions of AIA's, and ANA's. The comparable report series for 1980 was PC80-1-C, *General Social and Economic Characteristics*. Again, to accelerate delivery to users, there were three additional 1990 reports along the same lines as those described for 1990 CP-1 above: 1990 CP-2-1A, *Social and Economic Characteristics for American Indian and Alaska Native Areas*; 1990 CP-2-1B, *Social and Economic Characteristics for Metropolitan Areas*; and 1990 CP-2-1C, *Social and Economic Characteristics for Urbanized Areas*.

**\*1990 CP-3 (-1 through -30), Population Subject Reports**, covered population subjects and subgroups, as indicated by the titles in the chart in appendix 10A, and displayed both 100-percent and sample characteristics tabulated from the sample questionnaires. Geographic detail generally was limited to the United States, regions, and divisions; some reports, however, had tabulations for such highly populated areas as States, MA's, counties, and large places. (See app. 10A for the list of reports published, or cancelled in March 1993 due to budgetary constraints.)

1990 CP-S was the series designation for **Supplementary Reports**. No. 1, "Detailed Occupation and Other Characteristics from the EEO File for the United States," appeared in February 1993 and No. 2, "Detailed Ancestry Groups for States," in January 1993.

## Housing

**\*1990 CH-1 (-1 through 55), General Housing Characteristics**, contained detailed 100-percent statistics on units in structure, value and rent, number of rooms, tenure, and vacancy characteristics for States, counties, places of 1,000 or more inhabitants, MCD's of 1,000 or more inhabitants in selected States, State parts of AIA's, ANA's, and summary geographic areas such as urban and rural. The comparable 1980 data came from the 1980 report series HC80-1-A of the same title. As with the 1990 CP-1 series (see above), there were three single, additional reports: 1990 CH-1-1A, *General Housing Characteristics for American Indian and Alaska Native Areas*; 1990 CH-1-1B, *General Housing Characteristics for Metropolitan Areas*; and 1990 CH-1-1C, *General Housing Characteristics for Urbanized Areas*.

**\*1990 CH-2 (-1 through 55), Detailed Housing Characteristics**, focused on the housing subjects for which the census collected data on a sample basis. There were cross-tabulations of both 100-percent and sample characteristics. The reports showed statistics for States (including summaries such as urban and rural), counties, places of 2,500 or more inhabitants, MCD's of 2,500 or more inhabitants in selected States, the State portions of AIA's, and ANA's. The comparable report series for 1980 was HC80-1-B. Series 1990 CH-2 also had three single, additional reports that paralleled the ones described above: 1990 CH-2-1A, *Detailed Housing Characteristics for American*

*Indian and Alaska Native Areas*; 1990 CH-2-1B, *Detailed Housing Characteristics for Metropolitan Areas*; and 1990 CH-2-1C, *Detailed Housing Characteristics for Urbanized Areas*.

**\*1990 CH-3 (-1 through 10), Housing Subject Reports**, covered particular housing topics. They had both 100-percent and sample characteristics, but usually for the United States, regions, and divisions. Some reports had data for other highly populated areas such as States, metropolitan areas, counties, and large places. (See app. 10A for the list of reports published, or cancelled in March 1993 due to budgetary constraints.)

**1990 CH-S-1** was the series designation for the first group of reports from the housing items, called **1990 Housing Highlights**. Produced in the Housing and Household Economic Statistics (HHES) Division, they summarized some of the 100-percent data. These were two-page brochures with narrative, charts, and tables, one for each State, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and a U.S. summary; they were identified as 1990 CH-S-1-[State number]. With an initial press run of 6,000 copies each between August 1991 and January 1992, single-copy distribution was free. At the end of July 1992, the series was completed with four more brochures, respectively for American Samoa (AS), the Commonwealth of the Northern Mariana Islands (CNMI), Guam (G), and the Republic of Palau (P).

**1990 CH-S-2, Financial Facts**, appeared in June 1992; it was a four-page report that discussed changes in value and rent between the 1980 and 1990 censuses.

## Population and Housing

**\*1990 CPH-1 (-1 through -55), Summary Population and Housing Characteristics**, provided total population and housing-unit counts as well as summary 100-percent statistics (i.e., age, sex, race, Hispanic origin, household relationship, units in structure, value and rent, number of rooms, tenure, and vacancy characteristics) for local governments, including AI/ANA's. The staff designed this series to fulfill data needs met in 1980 by preliminary (PHC80-P) and advance final (PHC80-V) reports, and the 100-percent portion of the PHC80-3 series, *Summary Characteristics for Governmental Units and Standard Metropolitan Statistical Areas*.

**\*1990 CPH-2 (-1 through 55), Population and Housing Unit Counts**, contained total counts (100-percent) for population and housing units for States, counties, MCD's and census county divisions (CCD's), places, State component parts for MA's and UA's, and summary geographic areas (e.g., urban and rural, metropolitan and nonmetropolitan residence). The comparable report series for 1980 was PC80-1-A.

**\*1990 CPH-3 (-1 through -346), Population and Housing Characteristics for Census Tracts and Block Numbering Areas**, consisted of one report for each metropolitan statistical area (MSA) or primary MSA (PMSA) and one for the non-MSA/PMSA balance of each State (plus Puerto

Rico and the U.S. Virgin Islands), showing 100-percent and sample data for most of the census subjects. The tables' geographic hierarchy was MSA/PMSA-State-county-place of 10,000 or more inhabitants-census tract/block numbering area. The comparable 1980 report series was *Census Tracts*, PHC80-2.<sup>27</sup> Except for the 1990 CPH-3-1 *Finders Guide*, which had no maps, each report had one or more maps assembled and sold as separate packages; these were printed versions of the Census Tract/Block Numbering Area Outline Maps described on page 23.

\***1990 CPH-4 (-2 through -52), *Population and Housing Characteristics for Congressional Districts of the 103rd Congress***, provided one report for each State and the District of Columbia, displaying statistics on 100-percent and sample subjects for congressional districts (CD's). Within each CD, the tabulations were for counties, places of 10,000 or more inhabitants, county subdivisions of 10,000 or more inhabitants in selected States, and AI/ANA's. The comparable 1980 report series was PHC80-4 (for the 98th and 99th Congresses, and one State—Ohio—in the 100th Congress). The maps in the 1990 CPH-4 series also appeared in the *Congressional District Atlas*; customers could purchase map negatives separately for a fixed charge per State.

\***1990 CPH-5 (-1 through -55), *Summary Social, Economic, and Housing Characteristics***, consisted of one report for the United States (a summary), each State, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. The tabulations generally covered sample subjects for local governmental units (counties, places, and towns and townships), other county subdivisions, and AI/ANA's. Comparable data could be found in the sample portion of the 1980 report series PHC80-3. Most of the 1990 CPH-5 reports were released in June/July 1992, about 3 months ahead of their 1980 counterparts. Following the discovery of discrepancies in a few of the CPH-5 tables (income, disability, etc.), the Bureau offered corrected ones in late August and early September 1992.

**1990 CPH-6, *Social, Economic, and Housing Characteristics***, was the series designation for the Pacific outlying areas. Instead of being numbered, the individual reports carried suffixes:

| Suffix | Area   | Release date | Number of pages | Price (dollars) |
|--------|--|--------------|-----------------|-----------------|
| AS     | American Samoa                               | 05/92        | 392             | 19.00           |
| CNMI   | Commonwealth of the Northern Mariana Islands | 05/92        | 288             | 14.00           |
| G      | Guam   | 04/92        | 352             | 18.00           |
| P      | Republic of Palau                            | 04/92        | 260             | 13.00           |

**1990 CPH-E** was the series assigned to the 1990 census evaluation and research reports. (The comparable 1980 series was PHC80-E.) The numbers, titles, and issue dates were as follows:

1. "Content Reinterview Survey: Accuracy of Data for Selected Population and Housing Characteristics as Measured by Reinterview." 144 pp., Oct. 1993.
2. "Effectiveness of Quality Assurance." 148 pp., Sept. 1993.
3. "Programs to Improve Coverage in the 1990 Census." 148 pp., Nov. 1993.

**1990 CPH-I** was the series assigned to certain informational brochures that DPLD and DUSD published and distributed free of charge. The numbers, titles, and issue dates were as follows:

1. "Do You Know Which 1990 Report Is Similar to Your Favorite 1980 Report?" 6 pp., Oct. 1991.
2. "Do You Know Which Report Contains the Data You Need?" 6 pp., Oct. 1991.
- 3PR. "Introduction to [the] 1990 Census of Population and Housing Tabulation and Publication Program for Puerto Rico," two four-page versions: English (E), Nov. 1991; Spanish (S), Nov. 1991.
- 4PR. "1990 Census of Population and Housing Tabulation and Publication Program for Puerto Rico" in both English (E) and Spanish (S), 32 pp., Dec. 1991.
- 5VI. "Introduction to [the] 1990 Census of Population and Housing Tabulation and Publication Program for the Virgin Islands of the United States" 4 pp., Nov. 1991.
- 6VI. "1990 Census of Population and Housing Tabulation and Publication Program for the Virgin Islands of the United States" 4 pp., Nov. 1991.
- 7PI. "Introduction to [the] 1990 Census of Population and Housing Tabulation and Publication Program for the Pacific Outlying Areas" 4 pp., Nov. 1991.
8. "Census '90 Basics" 20 pp., Feb. 1991. Rev., June 1993.
9. "Census ABC's" 16 pp., Nov. 1989.
10. "Do You Know Which 1990 Products Contain Data on the Black Population?" 20 pp., Aug. 1993.
11. "Do You Know Which 1990 Products Contain Data on the American Indian, Eskimo, and Aleut Population?" 24 pp., June 1993.
12. "Do You Know Which 1990 Products Contain Data on the Asian and Pacific Islander Population?" 20 pp., June 1993.
13. "Do You Know Which 1990 Products Contain Data on the Hispanic Origin Population?" 52 pp., Jan. 1994.
14. "Information About 1990 Census Data for Preparing Grant Proposals" (cancelled).
15. "What Do I Need to Map Out Census Data?" 11 pp., Aug. 1992.
16. "Computer Access to the Nation's Numbers" (cancelled).
17. "Do You Know Which 1990 Products Contain Data on Ancestry?" 22 pp., Oct. 1993.

<sup>27</sup>The 1980 series presented data only for tracted areas, while the 1990 series had statistics for all parts of the United States, either as tracted areas or in the State balance as block numbering areas (BNA's).

18. "A Guide to State and Local Census Geography" 124 pp., Aug. 1993. (Joint venture with the Association of Public Data Users (APDU))
19. "Do You Know Which 1990 Products Contain Data on the Older Population?" 24 pp., Dec. 1993.

The Bureau published three brochures with summary data in them under the title **1990 Census Profile**. These were No. 1, "Population Trends and Congressional Apportionment" (4 pp., March 1991); No. 2, "Race and Hispanic Origin" (8 pp., July 1991); and No. 3, "Metropolitan Areas and Cities" (4 pp., November 1991).

The Geography Division issued a three-page brochure entitled "Area Measurement Information in the 1990 Census Data Products" in November 1992.

The Population Division, in cooperation with the National Institute on Aging, published two brochures with the series title **Profiles of America's Elderly** (2 pp. each) in October and November 1992. These were "Growth of America's Elderly in the 1980's" and "Growth of America's Oldest-Old Population."

**1990 CPH-L** was a long series (-1 to -140+) of unpublished "on demand" products that users could purchase directly at the cost of reproduction on paper or diskette. CPH-L-5 (May 1991), for example, was a seven-page package of State population counts. It compared the 1990 and 1980 figures for apportionment purposes by State, region, division, State size rank, and percent change. CPH-L-133 (April 1993), *Language Spoken at Home and Ability to Speak English for the United States, Regions, and States*, could be purchased as a two-diskette package, or the tabular equivalent of up to 200 pages. Beginning in July 1992, the Population and Housing and Household Economic Statistics Divisions (rather than the Data User Services Division) produced and sold most items in the "L" series.

**1990 CPH-R** was the designation for reference works:

1. *1990 Census of Population and Housing: Guide*, issued in three parts: A, *Text* (188 pp., Sept. 1992), B, *Glossary* (96 pp., Jan. 1993), and C, *Index to Summary Tape Files 1 to 4* (cancelled).
2. *1990 Census of Population and Housing: History*, was published in several parts, each consisting of two or more related chapters, beginning in 1993. (Part A. 140 pp., Oct. 1993.)
3. *1990 Census of Population, Alphabetical Index of Industries and Occupations* (394 pp., Jan. 1992).
4. *1990 Census of Population, Classified Index of Industries and Occupations* (292 pp., Apr. 1992).
5. *1990 Decennial Census Questionnaires and Other Public-Use Forms* (413 pp., Sept. 1993).<sup>28</sup>

<sup>28</sup>No. 5 was to be the *1990 Census of Population and Housing: Geographic Identification Code Scheme*, but this was cancelled. (See p. 26.)

**1990 CQC** (Census Questionnaire Content) was a series of free, two- to four-page bulletins issued periodically beginning in May 1992. Each one, headed "We asked... You told us," focused on a question or group of questions (e.g., race, or year moved in and year structure built) and graphically summarized the resultant data.

**1990 CDR** was the series designation for 14 **Content Determination Reports** (13 plus a summary called "Federal Legislative Uses of Decennial Census Data") issued between November 1989 and November 1990. These reports, which averaged about 40 pages each, discussed the background of specific population and housing census items, such as veteran's status, or a range of related items such as birthplace, citizenship, year of entry, and language, or financial characteristics (housing).

## Machine-Readable Products

### Summary Tapes

The release or issue dates specified in this section and in app. 10A (for series identified with an asterisk (\*) below) are those when the product was first made available for public sale.

**\*Summary tape file (STF) 1** for 1990 had about 1,000 cells/items of 100-percent population and housing counts and characteristics for each geographic area (the cell count for 1980 was 321). These files were the source of the 1990 CPH-1, -2, and -4 printed reports, and were issued on tape reels and cartridges, microfiche (Puerto Rico only), CD-ROM's, and CENDATA<sup>TM</sup>. **\*STF 1A**, issued by State between the end of March and early June 1991, had tabulations for States, counties, MCD's/CCD's, places, census tracts, BNA's, and block groups (BG's), as well as AI/ANA's and congressional districts of the 101st Congress (1989-90). There also was one tape each for Puerto Rico and the Virgin Islands (issued in August 1991) and one for the Pacific outlying areas (July 1992, on diskette as well).<sup>29</sup> There were 17 CD-ROM's for all of the above except the Pacific outlying areas; 16 of the compact discs appeared in October 1991, and 1 for Puerto Rico in April 1992.<sup>30</sup> DUSD also reproduced on paper on demand (at cost) in the 1990 CPH-L-4 series extracts from STF 1A. **\*STF 1B** had the same geographic hierarchy and inventories as 1A, except that it also had tabulations by block and summaries by MA and UA, and, accordingly, more megabytes. (STF 1B did not have records for blocks with zero population and housing units, but contained a "geographic headers file" that listed these.) The first tape, for Vermont, was issued at the end of July 1991, and the last ones in mid-October, followed by tapes for Puerto Rico and the Virgin Islands in

<sup>29</sup>The "Stateside" tapes were sold by the megabyte and could be amalgamated for price; those for Puerto Rico, the Virgin Islands, and the Pacific outlying areas could be amalgamated only with each other. In either case, there was a minimum order of \$175. There was a machine-readable data dictionary (STF-1 CRD) on the product tape, but it could be purchased separately. The compact disc for the Virgin Islands contained both STF's 1 and 3.

<sup>30</sup>CD90-1A-PR; this disc contained "redistricting data" as well (see discussion under P.L. 94-171 above).

November 1991. The Bureau accepted 1B tape orders by county. 1B CD-ROM's (10 discs), with release beginning in March 1992, were extracts of the tape files. **STF 1C** was a U.S. summary file issued in February 1992 (also on compact disc in dBASE format (May 1992)). It covered the United States, regions, divisions, States (including summaries such as urban and rural), counties, places of 10,000 or more inhabitants, MCD's of 10,000+ in selected States, MA's, urbanized areas (UA's), and AIAN areas. **STF 1D**, with release beginning in July 1992, was for the newly redistricted 103rd Congress. These files were by State; within each congressional district, there were tabulations for counties, places of 10,000+, MCD's of 10,000+ in selected States, and AI/ANA's.

\***STF 2** had 100-percent population and housing characteristics, but with over 2,000 cells/items (about the same number as for 1980), more subject detail than STF 1; it included records for the total population and iterations for racial and Hispanic-origin groups, and was the source of the 100-percent portion of the printed 1990 CPH-3 reports as well as a number of the reports in the 1990 CP-1 and CH-1 series. There were three files, issued only on tape: \***STF 2A**, issued between late September (for Indiana) and mid-November 1991, had data, by State, for census tracts/BNA's in MA's and in the remainder of each State in a geographic hierarchy of county, place of 10,000 or more inhabitants, with whole-tract/BNA summaries. Tapes for Puerto Rico (2A) and the Virgin Islands (single STF 2 only) appeared in April 1992. \***STF 2B** was an inventory-type file (all counties, all places of 1,000 or more inhabitants, and so forth) rather than in hierarchical structure. Data were presented for the State (with summaries such as urban and rural), counties, places of 1,000 or more inhabitants, MCD's in selected States, the State portions of AIA's, and ANA's in Alaska. Stateside STF 2B tapes were issued in November and December 1991, and the one for Puerto Rico in May 1992. **STF 2C** was the U.S. summary file. It followed the same geographic hierarchy as STF 1C (see above), except for the exclusion of selected UA summaries. STF 2C, which had 6,456 mb of data, required approximately 40 9-track tapes at 6,250 bpi, or 160 tapes at 1,600 bpi; it was released in May 1992.

\***STF 3** contained over 3,300 cells/items of sample population and housing characteristics for each geographic area, as compared with 1,126 cells for the 1980 tape. The 1990 file had many more summary areas as well. The four principal files varied by geography: \***STF 3A** (also on CD-ROM, on microfiche for Puerto Rico only, 80 tables on CENDATA™, and in print "portraits") had one file per State, with the same sequence as STF 1B (excluding block summaries). **STF 3B**, for five-digit ZIP Codes, had two components: The first was one data file for the entire country on 18 tapes (as compared with 7 for 1980) or 4 CD's, in ZIP Code order. The second component, the ZIP

Code/block equivalency file, equated the five-digit codes to census blocks (and identified the blocks that could not be assigned to ZIP's); it was issued on tape as a national file and consolidated onto three CD's.<sup>31</sup> STF 3B tapes appeared in April and May 1993, with the CD's behind them by about a month. **STF 3C** (also on CD-ROM—in a two-disc package issued in June 1993 following a production problem that required recreating the master discs) consisted of one file for the entire United States, in the same sequence as STF 1C. **STF 3D**—one file per State—concentrated on the congressional districts (CD's) of the 103rd Congress, with data in the same sequence as on STF 1D. The 3D tapes appeared on a flow basis, as the States certified their CD boundaries, from September 1992 through January 1993. In June 1993, the Bureau issued one compact disc containing the data from STF's 1D and 3D.

The first STF 3A tape—for Vermont—was released on March 19, 1992, with the last ones on May 29, 1992. At the end of June, however, Bureau staff discovered discrepancies in the STF 3A files, specifically with data on disability, weeks and hours worked, negative income, and public assistance. In July and August, the Bureau issued corrected STF 3A tapes to fill orders, and excerpts containing only the affected matrixes for "patching in" on CD-ROM's and CENDATA. Customers who had already purchased the original versions were alerted by mailed "User Notes" and other advisories, such as in *Census and You* and the *Monthly Product Announcement*, that corrected tables were available at no cost from DUSD.<sup>32</sup>

**STF 4** was the geographic counterpart of STF 2, but the number of cells was greater—approximately 11,000. The 1990 STF 4 was almost a third larger than in 1980<sup>33</sup>:

<sup>31</sup>This file was comparable to the 1980 census Master Area Reference File (MARF) 5. In June 1993, the Bureau began selling 1990 STF 3B equivalency files that related 1990 census geography to 1991 (rather than 1990) ZIP Codes.

<sup>32</sup>This was the Bureau's standard way of notifying users of minor discrepancies in its data products, or of announcing replacement plans. DUSD's "User Notes" supplied file purchasers with additional or corrected information after the technical documentation or files had been prepared. These notes were issued in a numbered series and automatically mailed to all users who purchased technical documentation from the Bureau; other users could obtain them by contacting DUSD. "User Notes" normally were accompanied by replacement pages for the technical documentation. The Bureau handled printed reports in a similar fashion with notes and corrected tables.

Sometimes, errors came to light during Bureau processing or after release: For example, the first comparatively simple files for "small" States might pass inspection, while later, more complex files revealed "glitches" (such as in data for urbanized areas or the farm population, or only with the State summary records) that then required checking earlier work and correcting hitherto unsuspected errors. Similarly, a problem in a particular file might only surface during intensive use by a purchaser, who then would report the difficulty (such as transposed data) for the Bureau to rectify in one way or another. In all, this was a situation that continued throughout the course of census data dissemination and its subsequent use.

<sup>33</sup>Source: 1990 Census Final Specifications for Summary Tape File 4 (Rev. #4), June 9, 1992.

|                   | 1990  | 1980  |
|-------------------|-------|-------|
| STF 4 components: |       |       |
| A record          | 4,205 | 4,839 |
| Population tables | 1,856 | 979   |
| Housing tables    | 2,349 | 3,860 |
| B record          | 6,902 | 3,558 |
| Population tables | 3,867 | 1,987 |
| Housing tables    | 3,035 | 1,571 |

The "A" records summarized data for the total population. The "B" records did the same plus for specified racial and Hispanic-origin groups (10 categories in STF 4A, and 49 categories in STF's 4B and 4C). The characteristics of ancestry groups, which were in the 1980 STF 4 files, moved to other products such as subject reports (and tapes; see below), and supplementary reports and listings.

There were three STF 4 files for 1990, all with the same subject-matter tables: **\*STF 4A** had data by State by geographic hierarchy: for counties, MCD's in selected States, places of 10,000 inhabitants or more, and census tracts/BNA's in MA's and in the remainder of each State. These files included summaries for whole tracts/BNA's. **\*STF 4B** was an inventory file (all counties, all places of 2,500 inhabitants or more, and so forth) rather than hierarchical in structure. It presented data for the State (including urban, rural, metropolitan, and nonmetropolitan components), counties, places of 2,500 population or more, MCD's of 2,500 or more in selected States (or less than 2,500 in New England MA's), and the State portions of AI/ANA's (including county parts). Issue of STF 4 began in March 1993.

Estimates of the 1990 STF 4A and 4B size exceeded expectations; the Bureau decided to make them more manageable for users by eliminating the place-of-work (POW) data from them and creating a separate file with only POW data. This was called the "Place of Work 20 Destinations File," or "STF 420." Files, for groups of States, contained all the tabulations from both STF 4A and 4B, plus subsets by race that customers could purchase individually.

**STF 4C** showed data for the United States, regions, divisions, States (including urban, rural, metropolitan, and nonmetropolitan components of all these areas), counties, places of 10,000 inhabitants or more, MCD's of 10,000 or more in selected States (but all MCD's in New England MA's), AI/ANA's, MA's, and UA's.

Users could obtain, on a cost-reimbursable basis, tract/BNA data equivalent to STF 4A for whatever race/Hispanic origin detail they specified from among the groups tallied for STF's 4B and 4C. Each 1990 STF 4 file was also available in a race/Hispanic origin version that included record A and the specified B records, and in a total-population version that had only record A and the total-population iteration of record B.

**Subject summary tape files** (SSTF's) corresponded to the printed reports in series 1990 CP-3, *Population Subject*

*Reports* (see p. 17), and usually contained more geographic detail than the printed reports. Issue began in June 1993.

**MARS** (modified age, race, and sex) **files** were a series of summary tapes that the Bureau issued in April 1992. They were designed for users who wanted race and age data by single years, tabulated by sex and Hispanic origin for several levels of geography. The data were modified from those presented in other products in several ways: The nearly 10 million persons reporting "Other race" were assigned to specified races listed for people with identical responses to the Hispanic origin question. (Hispanic origin was taken into account because over 95 percent of the "Other race" persons were of that origin.) For about 100 million persons, there were refined age data (usually by 1 year) from the 1990 census that had been modified because of reporting discrepancies: Many respondents tended to report age as of the date they completed the questionnaire instead of April 1, 1990 (Census Day), or to round up their ages if they were close to having a birthday. The problem was most pronounced for babies in the 0-to-1 year category (the 1990 census did not collect age in completed months). The staff modified the ages for individuals in households by adjusting the reported birth-year data by race and sex for each of the 449 census district offices to correspond with the National Center for Health Statistics' national-level quarterly distribution of births; they adjusted the data for persons in group quarters similarly, but on a State basis.

The MARS files were issued on tape reels and IBM 3480-compatible cartridges, in ASCII, with text from the 1990 CPH-L-74 (see p. 19) listings. STF-S-2A consisted of nine reels, one for each census division, by State, county, and tract/BNA. STF-S-2B was a national file for States, counties, MCD's in New England States, and by MCD's of 2,500 or more inhabitants in six States (Michigan, Minnesota, New Jersey, New York, Pennsylvania, and Wisconsin). STF-S-3 files went down to the county level, and STF-S-4 to that of places of 2,500 or more inhabitants. STF-S-5, also known as "SP 400" (released in January 1993), dealt with the number of workers by county of residence by county of work.

The **1990 Census/EEO** (equal employment opportunity) **file** was released in various formats—computer tape or cartridge, CD-ROM, print, and online. It offered data on occupation and educational attainment, cross-tabulated by sex, race, and Hispanic origin. There were occupation categories for the employed and an additional category of the experienced unemployed. The 512 categories were grouped into 6 summary groups (such as managerial and professional specialties, services, and farming, forestry, and fishing) and 13 major groups (such as private household occupations or sales). For the most part, the 1990 classifications were the same as those for 1980, but with some new categories, such as managers in food-serving and lodging establishments and family child-care providers. Users could choose files from three geographic arrangements: (1) Individual State files, grouped according to



region, each with records for counties and for places (and county subdivisions in 12 States) of 50,000 or more inhabitants. There were five groups of State files on tape—two for the South and one for each of the other three regions. (2) A national file containing a U.S. summary and data for all metropolitan areas. (3) A consolidated national file (U.S. total), with individual records for the United States, each State, county, MA, and place of 50,000 inhabitants or more. All of these tapes appeared in July 1992, as did selected tables on CENDATA™, followed by the 1990 CP-S paper report (also on fiche), with U.S. summaries of the EEO tabulations, in November 1992. An EEO tape for Puerto Rico was issued in March 1993 and a diskette for the Virgin Islands in June 1993. A two-CD-ROM package, containing the data from all the Stateside files, was released in February 1993.

### Public-Use Microdata Sample (PUMS)

PUMS files have been standard Census Bureau electronic products since 1960, offering researchers the opportunity to analyze and manipulate the responses collected on the “long form” census questionnaire, but for individual households/housing units. To avoid violating confidentiality, the Bureau rearranged the records as well as removed any information that would allow a particular person, household, or housing unit to be identified. (See p. 9.) The records could be recognized simply as coming from a particular State, or a combination of counties, or from some other geographic area with a population of at least 100,000.

For 1990, three PUMS files appeared: The 5-percent sample displayed data for single counties or groups of them, county subdivisions, places, and selected groups of census tracts, all with at least 100,000 inhabitants; the 1-percent sample had data for metropolitan or nonmetropolitan areas, or any mixture of the two, with 100,000 or more inhabitants. These areas were called “PUMA’s” (public-use microdata areas). There was also a 3-percent sample that concentrated on the elderly population, with the same geography as the 5-percent sample.

PUMS files were issued on magnetic tape beginning in the fall of 1992. There were PUMS files for the 50 States and the District of Columbia (5-, 3-, and 1-percent), Puerto Rico (5- and 1-percent (July 1993)), the Virgin Islands (10-percent), and Guam (10-percent (also on diskette)). Following tape production, the Bureau distributed CD-ROM’s for the Stateside files only. Technical documentation for all included suitable maps.

In early 1993, users discovered variations in the expected weighted population counts for some of the PUMA’s when compared with similar data from other census sample products. Bureau research found that some sample records had been assigned to the wrong PUMA in certain States, with a possible effect also on place-of-work and migration data. The problem apparently affected estimates at the subcounty level or, in some instances, estimates where more than one county was aggregated to form a PUMA. Staff corrected the problem and reissued all of the files before CD-ROM production began.

### User-Defined Areas Program (UDAP)

The Decennial Planning Division designed the UDAP for the 1990 census to quickly and inexpensively accommodate population and/or housing data users who wanted to specify their own geographic areas for tabulation purposes. There were certain Bureau ordering and processing criteria: The user-defined publication area (UDPA)—the composite geography of one order—had to be defined in terms of user-defined areas (UDA’s) with nonoverlapping boundaries. Further, each UDA had to be delineated in terms of whole 1990 census blocks and could not cross State boundaries. Any boundary disputes had to be resolved locally.

The program included a standard products package that consisted of tables, maps, and text. The generic set of tables presented demographic, social, economic, and housing characteristics. Designed to fulfill the needs of the widest range of potential program participants, the data tables also included percentages of persons and housing units in the sample and standard-error adjustment factors for each estimated characteristic. The text was similar to that in the published general reports; it presented definitions for the subject matter in the tables and a statement on the reliability of the data. Participants received maps on which to draw boundaries for their areas of interest, and then final computer-generated maps that outlined each UDA’s boundaries in the publication area. Optional narrative profiles had basic descriptive observations that would help readers focus on key variables and indicators that characterized the population and housing units within each UDA.<sup>34</sup>

UDAP customers included, for example, city planning departments that delineated UDA’s based on their planning areas, and utility companies that divided their service areas into neighborhoods describable as UDA’s.

Between 1991 and the summer of 1994, the UDAP staff filled 129 customer orders. In response to declining orders (from 71 in 1991 to 3 in the first 6 months of 1994), changes in the agency’s computer hardware (which would have required substantial modification of existing software), and the reassignment of personnel, Bureau management proposed ending this service. The agency solicited reactions to this proposal from internal and external data users in the summer of 1994. The data users polled did not object to halting the program, and the Bureau did so on September 16, 1994.

### Special Tabulations

Data users with unique needs (e.g., specialized cross-tabulations and/or geographic areas that required splitting blocks) that could not be satisfied either with the standard summary tapes or through the UDAP (above) could order special tabulations on a cost-reimbursable basis. Until 1992, sponsors had exclusive use of these tabulations for

<sup>34</sup>Cf. U.S. Bureau of the Census. *1990 User-Defined Areas Program, Narrative Profile* [1992].



6 months after receipt, after which the Bureau would be at liberty to sell copies. To meet the requirements of the Freedom of Information Act (Title 5, U.S. Code), this arrangement was changed so that special orders no longer extended proprietary rights, nor could the costs be prorated among subsequent requesters.<sup>35</sup> For example, a consortium of seven private vendors and four Federal agencies (such as the Agriculture and Justice Departments) contracted with the Census Bureau in 1992 to produce a special set of "1990 EEO Supplemental Tabulations" containing occupational and other labor-force data even more detailed than found in the basic EEO file. The Bureau also sold copies of these tapes to the general public. On the other hand, special tabulations by school district from the STF's were distributed solely by the Department of Education's National Center for Education Statistics (NCES), and the related TIGER/Line files (i.e., the Bureau's TIGER 1992 version (see p. 25) for school districts), by an NCES subcontractor (as well as the Bureau). In another example, the Department of Housing and Urban Development (HUD) sponsored a special tabulation for its 1993 Comprehensive Housing Affordability Strategy (CHAS) conferences (conducted with DUSD's help). This tabulation, containing selected characteristics (such as income) from the STF's at the block-group level, subsequently appeared on compact disc for general sale in July 1993.

The Bureau took slightly over 100 orders, totalling some \$6 million, for special tabulations between July (when orders were first accepted) and December 1992 alone. These included detailed tabulations, mainly for Federal and local government agencies, on such disparate topics as American Indians and Alaska Natives, commuting, school districts, veterans, and child day care.

**Census Transportation Planning Package (CTPP)**—The CTPP was a set of cost-reimbursable special tabulations that the Population Division produced in 1993-94 for each State's department of transportation. The detailed cross-tabulations, designed to meet the needs of State and local transportation planners, were for counties, places of 2,500 or more inhabitants, and custom-defined traffic analysis zones (TAZ's). The CTPP was a continuation of the 1970 and 1980 Urban Transportation Planning Package programs.

## Maps

The Census Bureau issued a variety of data product maps, some separately to accompany published data, and some as integral parts of printed reports. (See pp. 12 ff. for information on how the maps were produced.) The series for the 1990 census were as follows (the numbers in parentheses show the approximate number of mapsheets):

<sup>35</sup>For example, in 1982, the Bureau prepared STF 3B (ZIP Codes) from the 1980 census on a reimbursable basis for a consortium of vendors but was not able to sell the file to the public until 1984. In 1992, the Bureau contracted with a vendor to produce the 1990 STF 3B from the public-use STF 3A under the new 1992 rule; that allowed immediate general sale.

## 1990 County Block Maps

A comprehensive, multisheet, county-based reference series, with the greatest detail of all the Bureau maps. These maps depicted each county and statistically equivalent area on one or more mapsheets at one of 11 scales, depending on the county's areal size and the density of its block pattern. (Most counties had multiple mapsheets, including inset maps for densely settled areas.) Each county set had an index mapsheet for both parent and inset maps. The maps displayed block numbers and physical features/boundaries (blocks were the lowest level of decennial census geography for which 1990 census data were tabulated) and the boundaries, names, and codes for legal and statistical entities. The Bureau produced three versions of these maps:

**P.L. 94-171 County Block Maps (59,780)**, issued between December 1990 and April 1991, covered only counties with defined voting districts (VTD's). They showed VTD boundaries and codes for AI/ANA's, counties, county subdivisions, and incorporated places. (Not all States or counties defined VTD's, and some that did so did not define all of them.) A version was available for Puerto Rico.

**Census/STF County Block Maps (69,136)** were released between February 1991 and November 1991 to accompany the published reports and STF's. They did not have VTD information, but did cover all counties. These maps were created for Puerto Rico, and for the outlying areas as well.

**Entity-Based Block Maps (5,000)** were produced in 1992-93 as three series, one each for American Indian areas, Alaska Native areas, and places/census designated places (CDP's) in more than one county. These maps focused on selected governmental units and statistically equivalent entities other than counties; their content was the same as the county block maps, but scales focused coverage on selected governmental units and statistically equivalent entities other than counties. A planned fourth series, for county subdivisions, had to be cut for budgetary reasons.

## Outline Maps

**Voting District Outline Maps (7,819)**. These were small-scale, county-based maps specifically prepared for State officials who submitted VTD boundaries during phase 2 of the 1990 Census Redistricting Data Program (see p. 13). The maps, issued between February 1991 and June 1991, displayed all VTD boundaries and codes, the underlying features and feature names (streets, railroads, rivers, etc.), and the boundaries and names of AI/ANA's, counties, county subdivisions, and all places. There was a set of these maps for Puerto Rico, issued in June 1991.

**Census Tract/Block Numbering Area Outline Maps (5,708)**. These were full-size (36" x 42") county-based maps. They identified AI/ANA's, minor civil divisions (MCD's) and census county divisions (CCD's), incorporated places and census designated places (CDP's), and census tracts

or block numbering areas (BNA's), together with the cartographic base features and their names underlying the tract/BNA boundaries. (Census tracts covered most counties or county equivalents within metropolitan areas (MA's) and some large nonmetropolitan counties. Where there were no tracts, State officials or the Bureau defined BNA's.) Between February and April 1991, the Census Bureau issued these maps in electrostatically plotted form (and sold them until the end of 1992) for each State and the District of Columbia, Puerto Rico, and the outlying areas. The Government Printing Office later printed the set for further distribution to Federal depository libraries, and for sale, as packages by MSA or PMSA, and State remainders for non-MA counties.

**Urbanized Area Boundary Maps (459).** This was a series of full-size maps, one for each urbanized area (UA), with selected base features. The geographic hierarchy shown was AI/ANA, State, county, MCD/CCD, incorporated place/CDP, and UA—the last with boundaries, names, and major roads identified, and any fringe area highlighted to distinguish the extent of the UA. The Bureau issued these, in electrostatically plotted form, between October 1991 and February 1992.

**County Subdivision Outline Maps and Indexes (101).** This was a State-based map series issued in the spring of 1992, generally as single, full-sized mapsheets that identified counties, MCD's/CCD's, incorporated places, CDP's, and AI/ANA's.

**103rd Congressional District State Maps and 103rd Congressional District County Maps (NA).** These electrostatically plotted maps, produced on order, showed congressional district (CD) boundaries and their numbers. The State maps portrayed the CD information in combination with the content from the county subdivision maps (above), while the county maps showed CD information on the county block maps.

## Maps in Printed Reports

Most 1990 printed reports contained page-size (8-1/2" x 11" unless otherwise noted) reference outline maps that in many cases showed the geographic area of interest in several sections. These maps are briefly described below, together with the series and report numbers (including Puerto Rico and the outlying areas, as appropriate) in which they appeared. For issue dates, see the series listings in appendix 10A.

**The United States of America.** A single mapsheet of the Northern Hemisphere and all U.S. parts in their correct positions and at the same very small scale, with boundaries and names of the 50 States and the District of Columbia. In series 1990 CPH-1-1, CPH-2-1, CPH-5-1, CP-1-1, CH-1-1, CP-2-1, and CH-2-1.

**Census Regions and Divisions of the United States.** Very small scale, with outlines of census regions, divisions, and States of the United States in series 1990 CPH-1-1, CPH-2-1, CPH-5-1, CP-1-1, CH-1-1, CP-2-1, and CH-2-1.

**State and County Outline Map.** Small scale State-based maps with boundaries and names for all counties and statistically equivalent areas in series 1990 CPH-1-2 through 55, CPH-2-2 through 55, CPH-5-2 through 55, CP-1-2 through 55, CH-1-2 through 55, CP-2-2 through 55, and CH-2-2 through 55.

**County Subdivision Outline Maps and Location Indexes.** State-based maps, partitioned into multiple page-size sheets as appropriate, with scale varying from State to State. The index identified the sheet on which each county appeared. Bound into series 1990 CPH-1-2 through 55, CPH-2-2 through 55, CPH-5-2 through 55, CP-1-2 through 55, CH-1-2 through 55, CP-2-2 through 55, and CH-2-2 through 55.

**Metropolitan Areas of the United States: 1990.** A two-page U.S. map, showing the names and coverage of metropolitan statistical areas (MSA's), consolidated metropolitan statistical areas (CSMA's), and primary metropolitan statistical areas (PMSA's) officially defined as of June 30, 1990, with State boundaries and county boundaries within MA's. Bound into U.S. summary or national-level reports, i.e., series 1990 CPH-1-1, CPH-2-1, CPH-5-1, CP-1-1, CP-1-1B, CH-1-1, CH-1-1B, CP-2-1, CP-2-1B, CH-2-1, and CH-2-1B.

**State/Metropolitan Area Outline Maps.** Small-scale, page-size State maps showing county boundaries and names, and the extent of MSA's, CMSA's, and PMSA's for each State, including extent into adjacent States. They also displayed the locations and names of the State capital, each MA central city, and other larger places in the given States. Appeared in series 1990 CPH-2-2 through 53.

**Urbanized Areas of the United States: 1990.** A two-page U.S. map, showing locations and names of UA's, plus State and county boundaries. Bound into U.S. summary or national-level reports, i.e., series 1990 CPH-1-1, CPH-2-1, CPH-5-1, CP-1-1, CP-1-1C, CH-1-1, CH-1-1C, CP-2-1, CP-2-1C, CH-2-1, and CH-2-1C.

**Urbanized Area Outline Maps.** Small-scale maps showing the extent and component entities (AI/ANA's, States, counties, county subdivisions, and places) of each 1990 UA. In some cases, several small UA's were grouped on one page, while some large UA's required more than one page. Appeared in series 1990 CPH-2-2 through 53.

**American Indian and Alaska Native Areas: 1990.** A two-page U.S. map, plus 10 page-size insets, with names and locations of AI/ANA's, plus State and county boundaries. Bound into U.S. summary or national-level reports—series 1990 CPH-1-1, CPH-5-1, CP-1-1, CP-1-1A, CH-1-1, CH-1-1A, CP-2-1, CP-2-1A, CH-2-1, and CH-2-1A.

**Congressional District Outline Maps for the 103rd Congress.** State maps with larger-scale insets for boundary features in multidistrict counties, depicting the CD numbers and boundaries, and all counties. Appeared in series 1990 CPH-4-2 through 52 and in the **Congressional District Atlas**. These boundaries and codes also were incorporated in a wall-size map (see below).

## Thematic and Wall Maps

**Congressional Districts of the 103rd Congress of the United States.** A separate U.S., wall-size map (36" x 46") not in any report, on a scale of 1:5,000,000, produced in July 1993. It displayed State and county boundaries and names, and the boundaries and numbers of reapportioned congressional districts for the 103rd Congress (Jan. 3, 1993-Jan. 2, 1995), but with only ranges of numbers in complex areas.

**Major Acquisitions of Territory by the United States and Dates of Admission of States.** Small-scale, page-size U.S. map, with the boundary and name of each State and of each major U.S. acquisition; it also showed the year each State entered the Union and the name and date of each acquisition. Bound into the U.S. summary report 1990 CPH-2-1.

**Mean Center of Population of the United States: 1790-1990.** This page-size map displayed the United States, with State and county boundaries, as far west as Missouri and located the mean center of population for each census from 1790 to 1990. Appeared in the U.S. summary report 1990 CPH-2-1.

**Median Center of Population of the United States: 1880-1990.** This page-size map showed part of the eastern United States, with State and county boundaries, and located the median center of population for each census from 1880 to 1990. Appeared in the U.S. summary report 1990 CPH-2-1.

**Population and Geographic Centers of the United States: 1990.** This small-scale U.S. map, with State boundaries and their names, displayed the 1990 mean and median population centers and the geographic center of the United States. Appeared in the U.S. summary report 1990 CPH-2-1.

The Geography Division intended to produce a number of 46" x 30" thematic maps (generally on a 1:5,000,000 scale and some choropleth) in patterns and/or colors to display various characteristics from the 1990 census. These would appear in the GE-90 map series—not in any published report. Topics included persons of a given minority group as a percent of the total population in 1990, i.e., Blacks; Hispanics; Asians and Pacific Islanders; and American Indians, Eskimos, and Aleuts. The Bureau produced all four minority maps, in color, in 8-1/2" x 11" page form for special events and education programs only. The GE-90 map, No. 3, for Black persons, was issued in June 1992. The others, including the popular "night time" population distribution map, were initially canceled for budgetary reasons, then revived as part of the Bureau's intercensal education program. They were released in late 1994.

### TIGER/LINE® FILES AND OTHER TIGER EXTRACT PRODUCTS

The Bureau issued the following geographic products, primarily in electronic form, as public-use extracts from its TIGER data base for the 1990 census (see ch. 3 for the

development of the TIGER System) but not intended to be limited to that census's applications. Purchasers of the tapes and compact discs had to have (or obtain elsewhere) any necessary computer software to use these products. In general, there was technical documentation printed separately for each product, and it could be purchased alone. The appropriate documentation was supplied free with each tape order, and it appeared on each compact disc, from which it could be printed. Where there also were paper versions of these geographic files, they are mentioned.

**TIGER/Line® files.** These were magnetic nine-track tapes that reflected all 1990 census geographic area boundaries, codes, latitude and longitude coordinates (to six decimal places), for all linear and point features, feature names, and—in the urban and suburban parts of the most populous counties—address ranges and ZIP Codes. The tapes were issued by State, and by county within State, and priced by county plus a standard charge per State. The District of Columbia counted as 1 county and 1 State equivalent, Puerto Rico as 78 counties and 1 State equivalent, and the outlying areas as 16 and 1 (but 67 and 8 in the 1990 version; see below).

The **Prototype TIGER/Line file**, which contained governmental unit boundaries as of 1980, appeared in early 1989. A revised and updated version, the **Precensus TIGER/Line file**, followed later in the same year (October 1989 through February 1990). It had digital data for all 1990 census map features captured before enumeration as well as the preliminary 1990 census geographic area codes (census tract and block numbers), 1988 governmental unit boundaries, and address ranges for 528 counties. This file also appeared on 38 compact discs.

A third version, **Initial Voting District (VTD) Codes**, was released beginning in October 1990 for 2,512 counties. This updated the governmental-unit boundaries to January 1, 1990; included map features that 1990 census lists and local officials had added through mid-1989; contained the initial set of codes identifying voting districts for those States in the 1990 Census Redistricting Data Program (see p. 13); and provided information for selected feature landmarks (such as churches and schools) and polygons (area landmarks such as airports, parks, and military bases). It added several new record types covering landmark features, area landmarks and boundaries, and polygon locations.

The final version, called the **TIGER/Line® 1990 file** or the **post-census file**, was issued on tape in early 1991, and between June and September 1991 on 44 compact discs. This file contained the final 1990 governmental-unit boundaries (i.e., those in effect on Jan. 1, 1990, used for tabulating the 1990 census data), features for all counties, final voting-district codes, 1990 urban and suburban address ranges, and ZIP Codes. Each disc (for a single State, part of a State, or a group of States) included the relevant TIGER-GRF-N™ files (see below). Beginning in September 1993, **TIGER/Line® 1992 files** (originally called **School District Codes** or **version 5 files**) appeared on tape and

CD-ROM (the latter with viewing software). These files had Department of Education school district codes by county or groups of counties within States (but 1990 census data by school district were available from the Bureau only as special tabulations). The files also contained additional address ranges determined during the census but processed too late to include in earlier 1990 census geographic products (for 85 million households instead of only 55 million); congressional districts of the 103rd Congress; 1990 UA codes; urban-rural designations; and the latest boundary changes for governmental entities.

Two tapes issued in February 1993 dealt specifically with the congressional districts of the 103rd Congress; these were the **Block Equivalency File** and the **Geographic Entity File**. The first was a national file with 1990 census population and housing-unit counts with their associated land areas in hierarchical order. Following reports of spurious records and misallocated census blocks, the Bureau stopped distributing the Block Equivalency File in the spring of 1993. Specialists in the Geography Division located and resolved the problem areas, and the Bureau released a corrected file in September 1993. The second file (which also covered Puerto Rico, the Virgin Islands, Guam, and American Samoa, and could be purchased on diskette as well as tape) enabled data users to ascertain the congressional districts' geographic relationships to selected governmental and statistical geographic entities, and also retrieve the population and housing-unit counts and land area for each census geographic tabulation unit (GTUB) within that entity.

Another tape, scheduled for 1993 but delayed until 1994, was similar to the TIGER/Line 1992 file described above and was called **TIGER/SDTS™**. It presented the point, line, and area information from the TIGER file in a format that complied with the Federal Information Processing Standards/Spatial Data Transfer Standard (SDTS).<sup>36</sup>

The **TIGER/GICS™ (Geographic Identification Code Scheme)** was issued on a magnetic tape and a CD-ROM in the summer of 1993. Plans for a printed report (in series 1990 CPH-R) were cancelled. TIGER/GICS was a U.S. and State file of geographic names and codes (i.e., FIPS—Federal Information Processing Standards—codes, and/or census codes) for 1990 census geographic entities at the place and higher level, presented in both hierarchical and inventory order. The file also had area measurements and

internal point coordinates for appropriate entities and “components of water” (coastal, territorial, inland, and Great Lakes). The GICS file enabled TIGER/Line users to link a name with a geographic area code without resorting to a printed or other listing; general-purpose data users had here lists of all geographic entities in the United States in a single file rather than in the many separate STF's.

The **TIGER/GRF-N™ (Geographic Reference File—Names)** appeared on one magnetic tape in the spring of 1991, and (as noted above) was included, by State, in the TIGER/Line 1990 CD-ROM's. This was a list of names and codes for all the geographic entities for which the 1990 census provided data (State, American Indian and Alaska Native areas, county, county subdivision, subminor civil division, place, and voting district), by entity type (not in hierarchical sort or showing relationship codes, such as the county in which a city was located, etc.). There were earlier versions for the Precensus and Initial VTD Codes TIGER/Line files.

The **TIGER/Map Sheet Corner Point Coordinate™ file** was a national file on magnetic tape that allowed users to replicate the layout of Bureau-generated maps. Issued in July 1991, it contained basic information about the scale and geographic extent of the 1990 county block map sheets, as defined by latitude and longitude coordinates, that is, the maximum/minimum coordinate values for the map image areas on each sheet.

The **1991 Contiguous County file** was on one tape, released in March 1992. For every U.S. county, it identified all counties that (1) were physically adjacent (including areas separated by water but linked by a bridge or regular transportation service), (2) were nearby but not adjacent, (3) touched at a point, (4) or had economic integration as measured by commuter flows.

The **TIGER/Map Sheet Geography™** file listed on one magnetic tape the 1990 census county block mapsheets required for each American Indian/Alaska Native area, county subdivision, place, and census tract/block-numbering area. It was released in late 1991.

The **TIGER/UA Limit™** file appeared on one magnetic tape for the Nation, released in July 1992, and on the TIGER/Line 1990 Supplemental CD-ROM. It gave the coordinates for, and the names of, the features forming the boundary of each of the 405 UA's in the United States and Puerto Rico, using a format compatible with the TIGER/Line 1990 files.

The **TIGER/Census Tract Comparability™** file was one magnetic tape for the Nation, issued in April 1992, and on the TIGER/Line 1990 Supplemental CD-ROM. It identified boundary or number changes in census tracts from 1980 to 1990 and vice versa. (Note: There was no comparability between 1980 and 1990 census blocks or block-numbering areas or between 1980 enumeration districts and any 1990 census areas.)

The **TIGER/Census Tract Street Index™** came in two versions: Version 1 appeared as paper printouts in January 1992, on tape in April 1992, and on fiche in January 1993. It listed street names and address ranges, for the 550 counties that had them (generally as of the mid-1980's) in

<sup>36</sup>In September 1992, hurricanes caused severe damage in south Florida and on the island of Kauai. To aid civil and military agencies and insurance companies involved in cleanup and recovery, the Bureau produced that same month—on tape only—untested “beta” versions of the TIGER/Line files with school district codes and extended address ranges for four counties (Broward, Dade, and Monroe, FL; and Kauai, HI). Authorities also used the compact discs for STF's 1B and 3C to determine the number of housing units and persons that had been in each shattered block. In July 1993, when Midwestern rivers flooded, the Bureau offered “profiles” of demographic and economic data from the 1990 census for disaster counties and/or cities and towns within them. In a project called “FLOOD/FAX,” DUSD transmitted free profile copies by facsimile (fax) in response to telephoned or faxed requests from the media, local officials, and others. The Bureau of Economic Analysis displayed profile examples on its electronic bulletin board.

the 1990 post-census TIGER/Line files, by census tract. The tapes came in four file sets at 6,250 bpi, representing the four census geographic regions—Northeast, Midwest, South, and West. Version 2 (released as paper booklets in December 1994 and on CD-ROM between December 1994 and February 1995) contained address-range information updated to around Census Day 1990 for those streets with addressing systems in most counties. The files showed address ranges by census tract/block-numbering area, ZIP Code, and district of the 103rd Congress.

The Bureau began to issue a series of **TIGER/Boundary files** on tape in March 1993. These files were to contain digital representations of the boundaries for various geographic units, with a “thinned” set of coordinates (including those for the shorelines of major water features) suitable for use on microcomputers. Although the number of files in this series was reduced, the following files have been released: 1990 TIGER/103rd Congressional District Boundary File (March 1993), 1990 TIGER/Line® County Boundary File (August 1994), and 1990 TIGER/Urbanized Areas Limit File.

Three other TIGER/Line extracts were planned for release on CD-ROM in 1993, all associated with map reproduction. These files were to be sequential, unformatted ASCII text files with automated map-drawing commands and viewing software. None of these files was released.

## DATA DISSEMINATION

### Introduction

Disseminating data from the 1990 census had several aspects:

- Fulfilling the Census Bureau’s mandate to furnish statistics to Federal and State agencies, Congress, and the U.S. Government and Census depository library systems. The Superintendent of Documents, U.S. Government Printing Office, distributed most of the printed reports in this category, while the Bureau’s Data User Services Division (DUSD) was the primary dispenser of maps, fiche, and machine-readable products.
- Marketing these products and expanding the customer (user) base through direct sales, training, and information. Here, again, DUSD was the principal source (see below), with its effects multiplied by the Field Division’s Information Services Program (ISP) in the 12 regional offices. In 1992, ISP staff were responsible for over 1,000 workshops, presentations, site visits, exhibits, and the like, largely to offer census data.
- Supplying specific data in response to telephone or mail requests or directing the inquirers to appropriate sources, such as State data centers (see p. 30), local libraries, or vendors. Here, the ISP in the regional offices accounted for 150,000 inquiries in 1992, most of which related to 1990 census data. DUSD’s Customer Services Branch received another 80,000 calls (mainly about products),

and the Population Division’s Statistical Information Staff had 16,000 requests for specific figures. The Housing and Household Economic Statistics (HHES) Division handled about 15,000 calls, many related to income or similar topics. The Census Bureau library’s “outside” patrons requested 1,250 pieces of information, and roughly 300 of these were answered from the 1990 census. The Census Bureau/Bureau of Economic Analysis Electronic Forum’s “bulletin board” averaged 6,000 connections a month, with about 75 percent of them decennial-related.

- Providing data to the news media through press releases. In 1992, the Public Information Office (PIO) issued 68 of these; 51 of them emphasized sample data from STF 3A. During the same year, PIO responded to some 6,000 inquiries—most related to the 1990 census—from the media.

These four aspects often overlapped and were difficult to quantify beyond the primary measurements cited above and elsewhere in this section. While the Bureau could track such things as its own workshops, number of press releases, inquiries received, product sales (generally not covered in this history), and so forth, it could only estimate the extent of secondary use very broadly. Users who purchased products from vendors who had added other data and analysis to the summary tapes they bought from the Bureau, consulted library printed and electronic reference collections, belonged to university consortiums and schools, or consulted CENDATA™ (see p. 11), data centers (see p. 30 ff.), newspapers and journals, and the like, are examples of secondary users.

### User Relations

The Census Bureau’s attention to marketing its products and expanding its customer (user) base dates from the 1960’s. (For development through 1988, see *1980 Census of Population and Housing: History*, series PHC-R-2D (1989), ch. 8, p. 37 ff.) For the 1990 census, DUSD continued to have the primary role here, with assistance from the Field Division’s 12 regional offices and their information services specialists, the 1990 Census Promotional Office (see ch. 5), and the Public Information Office. Except for the Microdata Access Branch, which coordinated production of the PUMS files (see p. 22), and the Systems and Programming Branch, which arranged for copying and releasing public-use computer tapes and discs, all of the other seven DUSD branches<sup>37</sup> were more or less directly involved with data users and product marketing:

**Customer Services** answered inquiries by telephone, facsimile transmission (fax), and mail about 1990 data products and took and filled orders for computer tapes, discs, fiche, FastFax transmissions, and some printed

<sup>37</sup>Branch names are as of August 1992.

reports. (In June 1993, DUSD introduced "FastFax," an interactive fax service that allowed callers to choose data products from a "menu" connected to a "900" telephone number and have the specified tables delivered to their fax receivers. In its first 7 months of operation, FastFax responded to 356 requests for Bureau information from data users.) A significant number of calls were for GPO stock numbers and prices (GPO handled the sale of most printed reports and some maps). Traffic related to the 1990 census accounted for 80 percent of this branch's activity; the 1990 workload ranged from 65,000 inquiries and orders in fiscal year (FY) 1991, when customers' interests in the new products began in earnest, to 80,000 in the peak time of FY 1992.

The **Data Access and Use Branch** disseminated selected 1990 census statistics online through CENDATA™ (see p. 11) and produced the technical documentation that accompanied 1990 census and other machine-readable data files. It also published the *1990 Census of Population and Housing Guide*; the Bureau's newsletter for data users, *Census and You*; the *Monthly Product Announcement* and the annual *Census Catalog and Guide*; and a number of booklets dealing specifically with 1990 census products and programs, such as *Strength in Numbers*, which explained reapportionment and redistricting data, *Maps and More: Your Guide to Census Bureau Geography*, *Census '90 Basics*, and *Census ABC's: Applications in Business and Community*. (The Geography and Decennial Planning Divisions also prepared informational materials; see, for example, the 1990 CPH-1 brochures listed on p. 18.)

The **Statistical Compendia Branch**, regular publishers of the annual *Statistical Abstract*, produced the *City and County Data Book*, *County Statistics File 4 (COSTAT 4)*, and the *State and Metropolitan Area Data Book*, in electronic media as well as in book form. All of these drew heavily on 1990 census tabulations.

The **Training, Education, and Marketing (TEAM) Branch** mounted exhibits featuring and demonstrating 1990 census data products, surveyed user needs, produced illustrative slides and training modules, organized or assisted in user conferences (see below) and conducted workshops. As noted earlier, Field ISP staffs collaborated here in their regions. TEAM was responsible for the Census Bureau Education Program, which, in its post-census stage as the 1990 Census Education Project, familiarized teachers and schoolchildren with the use of 1990 census statistics. In July 1992, this branch released a 9.5-minute videotape, "Hitched to the Planet: Census Bureau Data and Geographic Inquiry," for geography and social studies teachers.

In addition to publishing this history and earlier volumes, the **History Branch** produced the *Factfinder for the Nation* series of brochures; a number of them covered decennial census products and their uses.

The **State and Regional Programs Branch** administered the State Data Center and Business and Industry Data Center Programs (see below), with regional ISP staffs acting as the centers' primary contacts for training and answering queries.

The **National Census Information Center Branch** was the prime mover for the National Services Program (see p. 29), and maintained the Bureau's National Clearinghouse for Census Data Services.

## User Conferences

Between January 1991 and January 1992, DUSD, in cooperation with regional offices, State data centers (SDC's), and others, coordinated a series of 23 national conferences to familiarize users with the extent and availability of 1990 census information and products. Nearly 4,000 persons attended this first round of conferences (regional and SDC staffs conducted additional conferences and workshops).

**Audience**—The sessions were geared to the intermediate users of census information, but the presentations introduced novices to the subject and gave specialized data to those more experienced. Participants rated their knowledge of census data prior to attending at 2.8 on a scale of 1-5 (1=limited, 5=considerable). Audience distribution was as follows:

29 percent represented such private-sector organizations as consultants, businesses, utility companies, chambers of commerce, and financial institutions.

33 percent were from libraries and universities.

29 percent were from the government sector—local, State, and Federal—and planning agencies.

The presentations received an overall rating of 4 on a 1-5 scale, as did the conferences' meeting the attendees' expectations.

| Date          | Place              | Attendance |
|---------------|--------------------|------------|
| Jan. 15, 1991 | Baltimore, MD      | 187        |
| Feb. 7, 1991  | Detroit, MI        | 277        |
| Apr. 17, 1991 | Boston, MA         | 203        |
| Apr. 26, 1991 | Dallas, TX         | 96         |
| Apr. 30, 1991 | Seattle, WA        | 240        |
| May 16, 1991  | Denver, CO         | 282        |
| May 22, 1991  | Miami, FL          | 104        |
| May 29, 1991  | Chicago, IL        | 392        |
| June 5, 1991  | Atlanta, GA        | 84         |
| June 6, 1991  | Philadelphia, PA   | 72         |
| June 12, 1991 | Minneapolis, MN    | 333        |
| Sept. 6, 1991 | St. Louis, MO      | 205        |
| Oct. 1, 1991  | Charlotte, NC      | 160        |
| Oct. 3, 1991  | Little Rock, AR    | 142        |
| Oct. 16, 1991 | Washington, DC     | 110        |
| Oct. 17, 1991 | Washington, DC     | 136        |
| Oct. 24, 1991 | Pittsburgh, PA     | 63         |
| Nov. 6, 1991  | San Jose, CA       | 145        |
| Nov. 7, 1991  | Los Angeles, CA    | 125        |
| Nov. 19, 1991 | Louisville, KY     | 228        |
| Dec. 3, 1991  | Virginia Beach, VA | 124        |
| Dec. 5, 1991  | New York, NY       | 63         |
| Jan. 17, 1992 | New Orleans, LA    | 150        |

(The Population Division sponsored two conferences specifically for Federal agencies; these were in Washington, DC, on September 11 and October 16, 1991. The first, with attendance of about 60 persons, focused on special tabulations from the census; the second, with about 500 people present, was more general.)



**Publicity**—The Bureau produced a flyer entitled, “Your Snapshot Inside...Get the Picture,” which each regional office reproduced as needed, about 5,000 copies per conference. The regional offices and the SDC’s mailed copies to their constituents; this flyer generated almost three-quarters of the registrations, although there was publicity in newsletters, *Census and You*, and by word of mouth.

**Agenda**—Each conference required a full day and had the same agenda. Bureau staff or others made slide presentations, described below. DUSD created the 35 mm slides used throughout, except that Geography Division introduced a new set and presentation for its topic about half way through the series. The conference topics were as follows:

“Tracking the Trends” (23 slides). A representative from the Bureau’s executive staff outlined some of the major demographic trends over the decade.

“How the Census Was Taken” (21 slides). A regional director or regional office representative focused on local activities.

“’90 Census Successes” (17 slides). The regional director highlighted major technological improvements that expedited census processing, especially the accelerated release of data products. In later conferences, this presentation replaced the one on census taking.

“Geography” (31 slides, plus 19 on TIGER). A DUSD representative or someone from the regional office’s geography staff reviewed the areas covered in the census and the types of data to be available for them.

“Content” (47 slides). A representative from either the Population (POP) or Housing and Household Economic Statistics (HHES) Division discussed data items and tabulations, and some of their uses.

“1990 Census Products” (50 slides). A DUSD staffer described the media and products, including maps and reference materials.

“Availability” (25 slides). Someone from the local area, usually an information services specialist from the regional office and/or an SDC representative, explained how and where to obtain the census data locally.

DUSD updated the conference information kits as new products and brochures appeared.

**Conference materials**—The information kits distributed at the meeting sites contained such brochures as the *Tabulation and Publication Program*, *Census ’90 Basics*, *Hidden Treasures!*, *CENDATA*, *Introduction to 1990 Census Products*, and the *Factfinder for the Nation*, “Census Geography—Concepts and Products,” as well as a telephone contacts list, a copy of the latest *Monthly Product Announcement*, and whatever 1990 data summaries were available at the time for the participants’ geographic areas.

### Seminars for Journalists

Following an earlier venture in 1990, DUSD and the Public Information Office (PIO) arranged seven conferences in 1991 at various universities, mainly for news

reporters. Among other things, the attendees learned how to retrieve census data from compact discs. These conferences were as follows:

|         |   |
|---------|---|
| Jan. 24 | Columbia University, New York             |
| Feb. 8  | University of Texas, Austin               |
| Feb. 21 | Northwestern University, Chicago campus   |
| Mar. 12 | University of Colorado, Boulder           |
| Mar. 21 | University of North Carolina, Chapel Hill |
| Mar. 26 | University of Washington, Seattle         |
| Apr. 2  | University of Missouri, Columbia          |

PIO and the Newspaper Association of America sponsored an 11-city series of 1-day seminars for reporters and editors in 1992 and 1993. Bureau analysts and demographic reporters reviewed trends that census statistics reveal and discussed innovative ways of presenting them to readers. Attendance started with 64 at the first seminar in Washington. The dates and places were as follows:

| 1992    |                   | 1993    |                 |
|---------|-------------------|---------|-----------------|
| Jul. 14 | Washington, DC    | Jan. 11 | Los Angeles, CA |
| Jul. 21 | Boston, MA        | Feb. 8  | Houston, TX     |
| Aug. 24 | Detroit, MI       | Mar. 8  | Kansas City, MO |
| Sep. 14 | Denver, CO        | Apr. 19 | Seattle, WA     |
| Oct. 16 | Atlanta, GA       |         |                 |
| Nov. 13 | San Francisco, CA |         |                 |
| Dec. 7  | Tampa, FL         |         |                 |

### National Services/Census Information Center Program (NSP/NCIC)

The NSP, established in 1974 and part of the Data User Services Division since 1980, served as the Bureau’s formal liaison with national nonprofit minority organizations, including social service, business, professional, civil rights, educational, and religious groups. It conducted or coordinated briefings, workshops, and presentations to assist these organizations in obtaining and using census data—primarily from the decennial census. NSP staff coordinated the Bureau’s promotional activities for the 1990 census with participating organizations in addition to exhibiting at their annual conferences—as many as 30 such gatherings each year. Census community awareness specialists (CCAS’s) in the census regions collaborated here as well. (See Chapter 5, “Census Promotional Program.”)

In early 1988, the NSP began a pilot project that evolved into the Census Information Center (CIC) Program, which was designed to complement the Bureau’s already-established State Data Center Program (see below) but address a more narrowly focused set of issues. Under terms of a jointly signed memorandum of understanding (MOU), participating organizations would receive selected summary tapes, microfiche, compact discs, and published reports (e.g., for the States where their populations were concentrated), on-site training by Bureau headquarters or regional office staff, technical assistance, and priority attendance at census workshops. The organizations, within agreed-upon guidelines, supplied the necessary personnel, technical equipment, and facilities to serve data users (and potential



users) among their respective constituencies, thus providing a “multiplier effect” in disseminating census statistics.

The pilot project started with the National Urban League (NUL) in Washington, DC. By mid-1992, the NUL had established information centers with some of its affiliates; these were in Baltimore, MD, Columbia, SC, Grand Rapids, MI, Jacksonville, FL, Knoxville, TN, New Orleans, LA, and Portland, OR.

In early 1990, the program accepted a new member, the Southwest Voter Research Institute in San Antonio, TX, which soon named centers for its Hispanic constituencies in Montebello, CA, and Dallas and Houston, TX. At roughly the same time, the Bureau began an information center project with the National Council of La Raza in Washington, DC. La Raza selected affiliates in Corpus Christi and Dallas, TX, Denver, CO, Embudo, NM, Kansas City, MO, and Phoenix, AZ.

In the summer of 1991, the CIC program was enlarged to extend memberships to organizations serving the Asian/Pacific Islander and American Indian/Alaska Native populations. The Asian/Pacific Islander Data Consortium and the IndianNet Information Center were chosen after an extensive selection process. The California-based consortium was composed of the Asian American Health Forum, in San Francisco; the Institute for Cultural Diversity at Sonoma State University, Rohnert Park; and Special Service for Groups, Los Angeles. The IndianNet Information Center, coordinated by Americans for Indian Opportunity in Washington, DC, named as affiliated centers the Indian and Native American Employment and Training Coalition, Washington, DC; Oklahomans for Indian Opportunity, Norman, OK; United South and Eastern Tribes, Nashville, TN; and the United Indians of All Tribes Foundation, in Seattle, WA.

The emerging program, which by 1992 had outgrown the pilot program stage, was officially sanctioned and renamed the National Census Information Center (NCIC) Program to be more descriptive of the participants’ activities and services.

In 1992, the Bureau and the University of Michigan entered into a joint statistical agreement (JSA), whereby that school’s Inter-University Consortium for Political and Social Research (ICPSR) received and disseminated 1990 census summary tape public-use sample files and offered its 350 member schools training in using census machine-readable data. The ICPSR was the Nation’s leading social science data archive, and had been serving the academic community for over 30 years with computer-readable data for research and instructional applications. The JSA also

asked the ICPSR to establish procedures to reach financially disadvantaged colleges and universities that otherwise would not have effective access to 1990 census products.

### **State Data Center (SDC)/Business and Industry Data Center (BIDC) Program**

The SDC program, established in 1978 with a few States, was a cooperative effort that grew between the Census Bureau and all the States, the District of Columbia, and the territories to make census information and data (primarily from the decennial census) available to the public. This was done through a network of State agencies, universities, libraries, and regional and local governments. By 1988, there were 54 lead agencies (i.e., one in each State or territory) and some 1,100 affiliates in the covered areas. At that time, the Bureau started a 1-year BIDC pilot program in 15 States. Here, coordinating (or lead) and affiliate agencies received economic data and related assistance and training from the Bureau and other Federal agencies to further economic development in their States and to assist businesses and other users of those statistics. By 1992, the number of SDC/BIDC affiliates had expanded to around 1,750, including BIDC participation in 23 States. Over all, the program serviced over 992,000 client data requests in calendar year 1991 and 1,150,000 (with some States not reported) in calendar year 1992, up from over 500,000 in 1985. Program responses ranged from data read over the telephone to elaborate special reports.

The Bureau furnished data products, training in data access and use, technical assistance, and consultation; the agencies, in turn, offered products and assistance to Government and community leaders, planners, business people, and others within their jurisdictions. Normally, these Bureau-supplied products were publications, computer tapes, compact discs, software, maps, and microfiche for the particular State. State-level lead and coordinating agencies received data for neighboring States as well. The Bureau kept the network informed through mail-outs (of press releases and the like) and an electronic bulletin board.

A typical SDC consisted of a State executive or planning agency together with a State university or library (or both), and several affiliates, such as public libraries, chambers of commerce, and regional planning agencies. The SDC/BIDC program had a nine-person steering committee that represented all the agencies; it met several times a year with Bureau staff to report on SDC/BIDC activities and to hear, propose, discuss, and react to future plans.

# APPENDIX 10A.

## Publication Schedule and Detail on Selected Series

### Publication Schedule and Index to Detail on Selected Series

| Series number | Report   | Number of reports | Release dates | Detail, see page |
|---------------|--|-------------------|---------------|------------------|
| CPH-1         | Summary Population and Housing Characteristics .....                                       | 55                | 08/91-08/92   | 10-2             |
| CPH-2         | Population and Housing Unit Counts .....   | 55                | 02/93-01/94   | 10-2             |
| CPH-3         | Population and Housing Characteristics for Census Tracts and Block Numbering Areas .....   | 346               | 05/93-02/94   | 10-3 - 10-7      |
| CPH-4         | Population and Housing Characteristics for Congressional Districts of 103rd Congress ..... | 54                | 01/93-04/93   | 10-8             |
| CPH-5         | Summary Social, Economic, and Housing Characteristics .....                                | 54                | 06/92-04/93   | 10-8             |
| CP-1          | General Population Characteristics .....   | 55                | 07/92-12/93   | 10-9 - 10-10     |
| CP-2          | Social and Economic Characteristics .....  | 55                | 10/93-05/94   | 10-9 - 10-10     |
| CP-3          | Population Subject Reports .....   | 7                 | 09/93-04/94   | 10-11            |
| CH-1          | General Housing Characteristics .....  | 55                | 09/92-05/93   | 10-12 - 10-13    |
| CH-2          | Detailed Housing Characteristics .....   | 55                | 09/92-05/93   | 12-12 - 10-13    |
| CH-3          | Housing Subject Reports .....  | 1                 | 04/94         | 10-13            |

### 1990 Machine-Readable Data Files

| Series   | Data file   | Release dates |             | Detail, see page |
|----------|---|---------------|-------------|------------------|
|          |   | Tapes         | CD-ROM      |                  |
| PL94-171 | Public Law 94-171 Tape File .....                                     | 02/91-07/91   | 02/91-03/91 | 10-14            |
| STF1A    | Summary Tape File 1A and Compact disc-read-only memory (CD-ROM) ..... | 04/91-07/92   | 10/91-04/92 | 10-15            |
| STF1B    | Summary Tape File 1B and Compact disc-read-only memory (CD-ROM) ..... | 09/91-11/91   | 03/92-11/93 | 10-16            |
| STF2A    | Summary Tape File 2A .....  | 09/91-04/92   | (NA)        | 10-17            |
| STF2B    | Summary Tape File 2B .....  | 11/91-05/92   | (NA)        | 10-17            |
| STF3A    | Summary Tape File 3A and Compact disc-read-only memory (CD-ROM) ..... | 03/92-05/92   | 08/92-02/93 | 10-18 - 10-19    |
| STF4A    | Summary Tape File 4A .....  | 03/93-05/93   | (NA)        | 10-20            |
| STF4B    | Summary Tape File 4B .....  | 06/93-12/93   | (NA)        | 10-20            |
| SSTF     | Subject Summary Tape Files .....                                      | 07/93-        | (NA)        | 10-21            |

NA Not applicable.

**Series CPH-1, Summary Population and Housing Characteristics**

| Geographic area      | Report number | Release date | Number of pages | Price (dollars) | Geographic area | Report number | Release date | Number of pages | Price (dollars) |
|----------------------|---------------|--------------|-----------------|-----------------|-----------------|---------------|--------------|-----------------|-----------------|
| United States        | 1             | 08/92        | 532             | 25.00           | Montana         | 28            | 09/91        | 156             | 8.00            |
| Alabama              | 2             | 09/91        | 248             | 12.00           | Nebraska        | 29            | 09/91        | 320             | 15.00           |
| Alaska               | 3             | 10/91        | 180             | 9.00            | Nevada          | 30            | 08/91        | 112             | 5.50            |
| Arizona              | 4             | 09/91        | 144             | 7.50            | New Hampshire   | 31            | 08/91        | 148             | 8.00            |
| Arkansas             | 5             | 09/91        | 324             | 16.00           | New Jersey      | 32            | 09/91        | 228             | 11.00           |
| California           | 6             | 09/91        | 326             | 16.00           | New Mexico      | 33            | 09/91        | 148             | 7.50            |
| Colorado             | 7             | 08/91        | 192             | 9.50            | New York        | 34            | 09/91        | 460             | 22.00           |
| Connecticut          | 8             | 08/91        | 150             | 8.00            | North Carolina  | 35            | 08/91        | 338             | 16.00           |
| Delaware             | 9             | 08/91        | 108             | 5.00            | North Dakota    | 36            | 09/91        | 296             | 14.00           |
| District of Columbia | 10            | 08/91        | 100             | 5.00            | Ohio            | 37            | 09/91        | 444             | 20.00           |
| Florida              | 11            | 09/91        | 296             | 14.00           | Oklahoma        | 38            | 09/91        | 264             | 13.00           |
| Georgia              | 12            | 09/91        | 303             | 15.00           | Oregon          | 39            | 08/91        | 180             | 9.00            |
| Hawaii               | 13            | 09/91        | 120             | 5.50            | Pennsylvania    | 40            | 09/91        | 632             | 30.00           |
| Idaho                | 14            | 08/91        | 156             | 8.00            | Rhode Island    | 41            | 08/91        | 100             | 4.75            |
| Illinois             | 15            | 09/91        | 554             | 27.00           | South Carolina  | 42            | 09/91        | 196             | 10.00           |
| Indiana              | 16            | 09/91        | 320             | 16.00           | South Dakota    | 43            | 09/91        | 256             | 13.00           |
| Iowa                 | 17            | 09/91        | 436             | 21.00           | Tennessee       | 44            | 10/91        | 230             | 12.00           |
| Kansas               | 18            | 09/91        | 356             | 17.00           | Texas           | 45            | 10/91        | 603             | 25.00           |
| Kentucky             | 19            | 08/91        | 256             | 12.00           | Utah            | 46            | 08/91        | 160             | 8.50            |
| Louisiana            | 20            | 09/91        | 268             | 13.00           | Vermont         | 47            | 08/91        | 149             | 8.00            |
| Maine                | 21            | 09/91        | 208             | 10.00           | Virginia        | 48            | 09/91        | 236             | 11.00           |
| Maryland             | 22            | 09/91        | 212             | 10.00           | Washington      | 49            | 09/91        | 212             | 11.00           |
| Massachusetts        | 23            | 09/91        | 186             | 10.00           | West Virginia   | 50            | 09/91        | 188             | 9.50            |
| Michigan             | 24            | 10/91        | 441             | 21.00           | Wisconsin       | 51            | 09/91        | 454             | 22.00           |
| Minnesota            | 25            | 11/91        | 607             | 30.00           | Wyoming         | 52            | 08/91        | 124             | 6.00            |
| Mississippi          | 26            | 09/91        | 228             | 11.00           | Puerto Rico     | 53            | 01/92        | 250             | 12.00           |
| Missouri             | 27            | 09/91        | 440             | 20.00           | Virgin Islands  | 55            | 11/91        | 71              | 4.00            |

**Series CPH-2, Population and Housing Unit Counts**

| Geographic area      | Report number | Release date | Number of pages | Price (dollars) | Geographic area | Report number | Release date | Number of pages | Price (dollars) |
|----------------------|---------------|--------------|-----------------|-----------------|-----------------|---------------|--------------|-----------------|-----------------|
| United States        | 1             | 01/94        | 876             | 41.00           | Montana         | 28            | 02/93        | 112             | 6.50            |
| Alabama              | 2             | 04/93        | 148             | 9.50            | Nebraska        | 29            | 04/93        | 156             | 10.00           |
| Alaska               | 3             | 04/93        | 120             | 6.00            | Nevada          | 30            | 03/93        | 104             | 6.00            |
| Arizona              | 4             | 05/93        | 116             | 6.50            | New Hampshire   | 31            | 04/93        | 116             | 6.50            |
| Arkansas             | 5             | 04/93        | 156             | 10.00           | New Jersey      | 32            | 05/93        | 160             | 10.00           |
| California           | 6             | 05/93        | 216             | 13.00           | New Mexico      | 33            | 04/93        | 112             | 6.50            |
| Colorado             | 7             | 04/93        | 132             | 7.00            | New York        | 34            | 05/93        | 200             | 12.00           |
| Connecticut          | 8             | 04/93        | 124             | 7.00            | North Carolina  | 35            | 02/93        | 176             | 11.00           |
| Delaware             | 9             | 04/93        | 104             | 5.50            | North Dakota    | 36            | 04/93        | 140             | 8.50            |
| District of Columbia | 10            | 04/93        | 104             | 6.00            | Ohio            | 37            | 05/93        | 208             | 12.00           |
| Florida              | 11            | 04/93        | 196             | 12.00           | Oklahoma        | 38            | 04/93        | 152             | 9.50            |
| Georgia              | 12            | 04/93        | 176             | 11.00           | Oregon          | 39            | 04/93        | 128             | 6.50            |
| Hawaii               | 13            | 04/93        | 108             | 5.50            | Pennsylvania    | 40            | 05/93        | 248             | 14.00           |
| Idaho                | 14            | 02/93        | 116             | 6.50            | Rhode Island    | 41            | 04/93        | 104             | 6.00            |
| Illinois             | 15            | 04/93        | 236             | 14.00           | South Carolina  | 42            | 04/93        | 132             | 7.50            |
| Indiana              | 16            | 04/93        | 172             | 10.00           | South Dakota    | 43            | 04/93        | 136             | 8.00            |
| Iowa                 | 17            | 04/93        | 180             | 11.00           | Tennessee       | 44            | 05/93        | 140             | 8.50            |
| Kansas               | 18            | 04/93        | 168             | 10.00           | Texas           | 45            | 04/93        | 268             | 15.00           |
| Kentucky             | 19            | 04/93        | 156             | 10.00           | Utah            | 46            | 03/93        | 120             | 7.00            |
| Louisiana            | 20            | 03/93        | 148             | 9.50            | Vermont         | 47            | 02/93        | 108             | 6.00            |
| Maine                | 21            | 04/93        | 124             | 6.50            | Virginia        | 48            | 04/93        | 164             | 9.50            |
| Maryland             | 22            | 04/93        | 148             | 9.50            | Washington      | 49            | 04/93        | 144             | 8.50            |
| Massachusetts        | 23            | 04/93        | 144             | 8.00            | West Virginia   | 50            | 05/93        | 128             | 7.50            |
| Michigan             | 24            | 04/93        | 196             | 12.00           | Wisconsin       | 51            | 05/93        | 192             | 12.00           |
| Minnesota            | 25            | 05/93        | 216             | 13.00           | Wyoming         | 52            | 03/93        | 108             | 6.00            |
| Mississippi          | 26            | 04/93        | 140             | 8.50            | Puerto Rico     | 53            | 09/93        | 316             | 21.00           |
| Missouri             | 27            | 05/93        | 192             | 12.00           | Virgin Islands  | 55            | 08/93        | 76              | 5.00            |

Series CPH-3, Population and Housing Characteristics for Census Tracts and Block Numbering Areas

| Geographic area                                       | Report number | Release date | Number of pages                | Price (dollars) | Geographic area                          | Report number | Release date | Number of pages  | Price (dollars) |
|---|---------------|--------------|--------------------------------|-----------------|--|---------------|--------------|------------------|-----------------|
| Finders Guide to Census Tract Reports .....           | 1             | 10/93        | 80                             | 5.50            | Puerto Rico (in Eng. & Span.)            | 53            | 01/94        | 684              | 40.00           |
| Alabama .....   | 2             | 06/93        | 1) 508<br>2) 636               | 41.00           | Not assigned .....                       | 54            |              |                  |                 |
| Alaska .....  | 3             | 05/93        | 440                            | 24.00           | Virgin Islands .....                     | 55            | 02/94        | 196              | 13.00           |
| Arizona .....   | 4             | 06/93        | 756                            | 38.00           | Not assigned .....                       | 56            | (NA)         | (NA)             | (NA)            |
| Arkansas .....  | 5             | 06/93        | 972                            | 40.00           | Not assigned .....                       | 57            | (NA)         | (NA)             | (NA)            |
| California .....                                      | 6             | 08/93        | 1) 568<br>2) 552               | 44.00           | Abilene, TX MSA .....                    | 58            | 09/93        | 256              | 16.00           |
| Colorado .....  | 7             | 06/93        | 620                            | 36.00           | Aguadilla, PR MSA .....                  | 59            | 12/93        | 340              | 20.00           |
| Connecticut .....                                     | 8             | 06/93        | 288                            | 16.00           | Albany, GA MSA .....                     | 60            | 06/93        | 264              | 15.00           |
| Delaware .....  | 9             | 06/93        | 296                            | 17.00           | Albany-Schenectady-Troy, NY MSA .....    | 61            | 08/93        | 484              | 30.00           |
| District of Columbia (not assigned—see report 331) .. | 10            | (NA)         | (NA)                           | (NA)            | Albuquerque, NM MSA .....                | 62            | 07/93        | 584              | 34.00           |
| Florida .....   | 11            | 09/93        | 840                            | 41.00           | Alexandria, LA MSA .....                 | 63            | 07/93        | 276              | 17.00           |
| Georgia .....   | 12            | 06/93        | 1) 550<br>2) 692<br>3) 672     | 48.00           | Allentown-Bethlehem-Easton, PA-NY .....  | 64            | 08/93        | 420              | 25.00           |
| Hawaii .....  | 13            | 06/93        | 372                            | 21.00           | Altoona, PA MSA .....                    | 65            | 07/93        | 220              | 14.00           |
| Idaho .....   | 14            | 08/93        | 672                            | 40.00           | Amarillo, TX MSA .....                   | 66            | 08/93        | 300              | 19.00           |
| Illinois .....  | 15            | 08/93        | 1) 624<br>2) 584               | 45.00           | Anchorage, AK MSA .....                  | 67            | 05/93        | 256              | 15.00           |
| Indiana .....   | 16            | 09/93        | 926                            | 43.00           | Anderson, IN MSA .....                   | 68            | 06/93        | 220              | 13.00           |
| Iowa .....  | 17            | 08/93        | 844                            | 41.00           | Anderson, SC MSA .....                   | 69            | 07/93        | 246              | 15.00           |
| Kansas .....  | 18            | 07/93        | 932                            | 43.00           | Anniston, AL MSA .....                   | 70            | 05/93        | 260              | 15.00           |
| Kentucky .....  | 19            | 08/93        | 1) 548<br>2) 540               | 44.00           | Appleton-Oshkosh-Neenah, WI MSA .....    | 71            | 08/93        | 328              | 20.00           |
| Louisiana .....                                       | 20            | 08/93        | 1) 554<br>2) 546               | 45.00           | Arecibo, PR MSA .....                    | 72            | 12/93        | 340              | 20.00           |
| Maine .....   | 21            | 07/93        | 456                            | 27.00           | Asheville, NC MSA .....                  | 73            | 08/93        | 272              | 17.00           |
| Maryland .....  | 22            | 08/93        | 392                            | 23.00           | Asheville, NC MSA .....                  | 73            | 08/93        | 272              | 17.00           |
| Massachusetts .....                                   | 23            | 08/93        | 404                            | 24.00           | Athens, GA MSA .....                     | 74            | 06/93        | 264              | 15.00           |
| Michigan .....  | 24            | 09/93        | 964                            | 43.00           | Atlanta, GA MSA .....                    | 75            | 09/93        | 1) 772<br>2) 752 | 48.00           |
| Minnesota .....                                       | 25            | 09/93        | 836                            | 40.00           | Atlantic City, NJ MSA .....              | 76            | 06/93        | 344              | 20.00           |
| Mississippi .....                                     | 26            | 08/93        | 1) 692<br>2) 756               | 56.00           | Augusta, GA-SC MSA .....                 | 77            | 09/93        | 480              | 29.00           |
| Missouri .....  | 27            | 09/93        | 1,000                          | 43.00           | Austin, TX MSA .....                     | 78            | 08/93        | 880              | 42.00           |
| Montana .....   | 28            | 06/93        | 536                            | 33.00           | Bakersfield, CA MSA .....                | 79            | 08/93        | 620              | 38.00           |
| Nebraska .....  | 29            | 08/93        | 600                            | 37.00           | Baltimore, MD MSA .....                  | 80            | 06/93        | 1) 644<br>2) 746 | 42.00           |
| Nevada .....  | 30            | 07/93        | 344                            | 22.00           | Bangor, ME MSA .....                     | 81            | 06/93        | 208              | 12.00           |
| New Hampshire .....                                   | 31            | 07/93        | 316                            | 19.00           | Baton Rouge, LA MSA .....                | 82            | 06/93        | 448              | 27.00           |
| New Jersey (not assigned—see counties for NJ MSA) ..  | 32            | (NA)         | (NA)                           | (NA)            | Battle Creek, MI MSA .....               | 83            | 06/93        | 272              | 15.00           |
| New Mexico .....                                      | 33            | 07/93        | 1,004                          | 40.00           | Beaumont-Port Arthur, TX MSA .....       | 84            | 09/93        | 476              | 29.00           |
| New York .....  | 34            | 08/93        | 782                            | 41.00           | Bellingham, WA MSA .....                 | 85            | 09/93        | 216              | 14.00           |
| North Carolina .....                                  | 35            | 08/93        | 1) 936<br>2) 924               | 51.00           | Benton Harbor, MI MSA .....              | 86            | 06/93        | 260              | 16.00           |
| North Dakota .....                                    | 36            | 09/93        | 424                            | 25.00           | Billings, MT MSA .....                   | 87            | 09/93        | 229              | 14.00           |
| Ohio .....  | 37            | 08/93        | 1) 624<br>2) 572               | 45.00           | Biloxi-Gulfport, MS MSA .....            | 88            | 07/93        | 312              | 19.00           |
| Oklahoma .....  | 38            | 08/93        | 1) 612<br>2) 608               | 45.00           | Binghamton, NY MSA .....                 | 89            | 07/93        | 248              | 15.00           |
| Oregon .....  | 39            | 08/93        | 688                            | 40.00           | Birmingham, AL MSA .....                 | 90            | 05/93        | 788              | 38.00           |
| Pennsylvania .....                                    | 40            | 08/93        | 692                            | 40.00           | Bismarck, ND MSA .....                   | 91            | 07/93        | 204              | 13.00           |
| Rhode Island .....                                    | 41            | 09/93        | 486                            | 14.00           | Bloomington, IN MSA .....                | 92            | 07/93        | 216              | 14.00           |
| South Carolina .....                                  | 42            | 09/93        | 1,004                          | 43.00           | Bloomington-Normal, IL MSA ..            | 93            | 06/93        | 236              | 14.00           |
| South Dakota .....                                    | 43            | 08/93        | 468                            | 29.00           | Boise City, ID MSA .....                 | 94            | 06/93        | 252              | 15.00           |
| Tennessee .....                                       | 44            | 07/93        | 956                            | 43.00           | <b>Boston-Lawrence-Salem, MA-NH CMSA</b> |               |              |                  |                 |
| Texas .....   | 45            | 09/93        | 1) 1,042<br>2) 980<br>3) 1,184 | 51.00           | Boston, MA PMSA .....                    | 95A           | 09/93        | 1) 652<br>2) 596 | 45.00           |
| Utah .....  | 46            | 07/93        | 384                            | 23.00           | Brockton, MA PMSA .....                  | 95B           | 08/93        | 256              | 16.00           |
| Vermont .....   | 47            | 05/93        | 328                            | 19.00           | Lawrence-Haverhill, MA-NH PMSA .....     | 95C           | 09/93        | 348              | 21.00           |
| Virginia .....  | 48            | 09/93        | 1,020                          | 43.00           | Lowell, MA PMSA .....                    | 95D           | 08/93        | 284              | 17.00           |
| Washington .....                                      | 49            | 09/93        | 1,164                          | 41.00           | Nashua, NH PMSA .....                    | 95E           | 09/93        | 224              | 14.00           |
| West Virginia .....                                   | 50            | 08/93        | 608                            | 37.00           | Salem-Gloucester, MA PMSA .....          | 95F           | 09/93        | 256              | 16.00           |
| Wisconsin .....                                       | 51            | 09/93        | 820                            | 41.00           | Bradenton, FL MSA .....                  | 96            | 05/93        | 284              | 16.00           |
| Wyoming .....   | 52            | 07/93        | 412                            | 26.00           | Bremerton, WA MSA .....                  | 97            | 09/93        | 252              | 15.00           |
|   |               |              |                                |                 | Brownsville-Harlingen, TX MSA .....      | 98            | 09/93        | 416              | 25.00           |
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| Buffalo, NY PMSA .....                         | 100A          | 08/93        | 480  | 30.00           | Des Moines, IA MSA .....                          | 133           | 06/93        | 328              | 20.00           |
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| Burlington, NC MSA .....                       | 101           | 07/93        | 236  | 15.00           | Ann Arbor, MI PMSA .....                          | 134A          | 07/93        | 368              | 22.00           |
| Burlington, VT MSA .....                       | 102           | 05/93        | 208  | 12.00           | Detroit, MI PMSA .....                            | 134B          | 09/93        | 1) 628<br>2) 728 | 52.00           |
| Canton, OH MSA .....                           | 103           | 07/93        | 352  | 21.00           | Dothan, AL MSA .....                              | 135           | 05/93        | 284              | 16.00           |
| Casper, WY MSA .....                           | 104           | 06/93        | 212  | 13.00           | Dubuque, IA MSA .....                             | 136           | 07/93        | 212              | 13.00           |
| Cedar Rapids, IA MSA .....                     | 105           | 06/93        | 248  | 14.00           | Duluth, MN-WI MSA .....                           | 137           | 09/93        | 720              | 18.00           |
| Champaign-Urbana-Rantoul, IL MSA .....         | 106           | 06/93        | 304  | 18.00           | Eau Claire, WI MSA .....                          | 138           | 07/93        | 244              | 15.00           |
| Charleston, SC MSA .....                       | 107           | 07/93        | 588  | 36.00           | El Paso, TX MSA .....                             | 139           | 09/93        | 460              | 29.00           |
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| Aurora-Elgin, IL PMSA .....                    | 113A          | 08/93        | 444  | 27.00           | Fargo-Moorhead, ND-MN MSA .....                   | 146           | 09/93        | 244              | 15.00           |
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| Columbia, MO MSA .....                         | 119           | 06/93        | 232  | 14.00           | Glens Falls, NY MSA .....                         | 162           | 09/93        | 208              | 13.00           |
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| Kankakee, IL MSA                           | 192           | 06/93        | 244  | 14.00           | Milwaukee, WI PMSA                                      | 231A          | 09/93        | 868  | 42.00           |
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| Lexington-Fayette, KY MSA                  | 210           | 06/93        | 320  | 20.00           | Danbury, CT PMSA  | 245C          | 08/93        | 256  | 16.00           |
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| Orlando, FL MSA .....   | 252           | 09/93        | 992                        | 43.00           | Salinas-Seaside-Monterey, CA<br>MSA .....          | 289           | 08/93        | 420                | 25.00           |
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| Pensacola, FL MSA .....   | 257           | 06/93        | 396                        | 16.00           | <b>San Francisco-Oakland-San<br/>Jose, CA CMSA</b> |               |              |                    |                 |
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| Philadelphia, PA-NJ PMSA .....                                    | 259A          | 09/93        | 1) 756<br>2) 728<br>3) 696 | 53.00           | San Jose, CA PMSA .....                            | 294C          | 09/93        | 1) 840<br>2) 820   | 49.00           |
| Trenton, NJ PMSA .....  | 259B          | 09/93        | 324                        | 20.00           | Santa Cruz, CA PMSA .....                          | 294D          | 09/93        | 392                | 23.00           |
| Vineland-Millville-Bridgeton,<br>NJ PMSA .....                    | 259C          | 08/93        | 260                        | 16.00           | Santa Rosa-Petaluma, CA<br>PMSA .....              | 294E          | 09/93        | 412                | 25.00           |
| Wilmington, DE-NJ-MD<br>PMSA .....                                | 259D          | 10/93        | 473                        | 29.00           | Vallejo-Fairfield-Napa, CA<br>PMSA .....           | 294F          | 08/93        | 624                | 38.00           |
| Phoenix, AZ MSA .....   | 260           | 06/93        | 1) 712<br>2) 704           | 44.00           | <b>San Juan-Caguas, PR<br/>CMSA</b>                |               |              |                    |                 |
| Pine Bluff, AR MSA .....  | 261           | 06/93        | 240                        | 14.00           | Caguas, PR PMSA .....                              | 295A          | 01/94        | 412                | 24.00           |
| <b>Pittsburgh-Beaver Valley,<br/>PA CMSA</b>                      |               |              |                            |                 | San Juan, PR PMSA .....                            | 295B          | 01/94        | 1) 684<br>2) 600   | 45.00           |
| Beaver County, PA PMSA .....                                      | 262A          | 09/93        | 244                        | 16.00           | Santa Barbara-Santa Maria-<br>Lompoc, CA MSA ..... | 296           | 09/93        | 496                | 31.00           |
| Pittsburgh, PA PMSA .....   | 262B          | 09/93        | 1) 588<br>2) 556           | 44.00           | Santa Fe, NM MSA .....                             | 297           | 06/93        | 288                | 17.00           |
| Pittsfield, MA MSA .....  | 263           | 09/93        | 196                        | 13.00           | Sarasota, FL MSA .....                             | 298           | 06/93        | 276                | 15.00           |
| Ponce, PR MSA .....   | 264           | 12/93        | 392                        | 23.00           | Savannah, GA MSA .....                             | 299           | 06/93        | 256                | 14.00           |
| Portland, ME MSA .....  | 265           | 09/93        | 244                        | 15.00           | Scranton-Wilkes Barre, PA<br>MSA .....             | 300           | 09/93        | 384                | 23.00           |
| Portland-Vancouver, OR-WA<br>CMSA .....                           | 266           | 08/93        | 272                        | 17.00           | <b>Seattle-Tacoma, WA CMSA</b>                     |               |              |                    |                 |
| Portland, OR PMSA .....   | 266A          | 09/93        | 844                        | 41.00           | Seattle, WA PMSA .....                             | 301A          | 09/93        | 1) 624<br>2) 700   | 46.00           |
| Vancouver, WA PMSA .....  | 266B          | 08/93        | 266                        | 17.00           | Tacoma, WA PMSA .....                              | 301B          | 09/93        | 468                | 28.00           |
| Portsmouth-Dover- Rochester,<br>NH-ME MSA .....                   | 267           | 09/93        | 288                        | 14.00           | Sharon, PA MSA .....                               | 302           | 09/93        | 224                | 14.00           |
| Poughkeepsie, NY MSA .....  | 268           | 09/93        | 276                        | 17.00           | Sheboygan, WI MSA .....                            | 303           | 09/93        | 216                | 14.00           |
| <b>Providence-Pawtucket-Fall<br/>River, RI-MA CMSA</b>            |               |              |                            |                 | Sherman-Denison, TX MSA .....                      | 304           | 09/93        | 236                | 15.00           |
| Fall River, MA-RI PMSA .....                                      | 269A          | 09/93        | 224                        | 14.00           | Shreveport, LA MSA .....                           | 305           | 06/93        | 416                | 25.00           |
| Pawtucket-Woonsocket-<br>Attleboro, RI-MA PMSA .....              | 269B          | 08/93        | 328                        | 20.00           | Sioux City, IA-NE MSA .....                        | 306           | 08/93        | 220                | 14.00           |
| Providence, RI PMSA .....   | 269C          | 09/93        | 452                        | 18.00           | Sioux Falls, SD MSA .....                          | 307           | 07/93        | 216                | 14.00           |
| Provo-Orem, UT MSA .....  | 270           | 07/93        | 292                        | 18.00           | South Bend-Mishawaka, IN<br>MSA .....              | 308           | 06/93        | 308                | 19.00           |
| Pueblo, CO MSA .....  | 271           | 05/93        | 308                        | 18.00           | Spokane, WA MSA .....                              | 309           | 09/93        | 308                | 19.00           |
| Raleigh-Durham, NC .....  | 272           | 09/93        | 692                        | 40.00           | Springfield, IL MSA .....                          | 310           | 06/93        | 268                | 15.00           |
| Rapid City, SD MSA .....  | 273           | 07/93        | 220                        | 14.00           | Springfield, MO MSA .....                          | 311           | 06/93        | 260                | 15.00           |
| Reading, PA MSA .....   | 274           | 09/93        | 284                        | 17.00           | Springfield, MA MSA .....                          | 312           | 09/93        | 352                | 21.00           |
| Redding, CA MSA .....   | 275           | 09/93        | 232                        | 14.00           | State College, PA MSA .....                        | 313           | 09/93        | 220                | 14.00           |
| Reno, NV MSA .....  | 276           | 09/93        | 356                        | 22.00           | Steubenville-Weirton, OH-WV<br>MSA .....           | 314           | 08/93        | 248                | 15.00           |
| Richland-Kennewick-Pasco,<br>WA MSA .....                         | 277           | 09/93        | 284                        | 17.00           |  |               |              |                    |                 |
| Richmond-Petersburg, VA<br>MSA .....                              | 278           | 06/93        | 648                        | 36.00           |  |               |              |                    |                 |



Series CPH-3, Population and Housing Characteristics for Census Tracts and Block Numbering Areas—Continued

| Geographic area                | Report number | Release date | Number of pages | Price (dollars) | Geographic area            | Report number | Release date | Number of pages | Price (dollars) |
|--------------------------------|---------------|--------------|-----------------|-----------------|----------------------------|---------------|--------------|-----------------|-----------------|
| Stockton, CA MSA.....          | 315           | 09/93        | 652             | 40.00           | Waterbury, CT MSA.....     | 332           | 05/93        | 4) 592          | 15.00           |
| Syracuse, NY MSA.....          | 316           | 09/93        | 392             | 23.00           | Waterloo-Cedar Falls, IA   |               |              | 256             |                 |
| Tallahassee, FL MSA.....       | 317           | 06/93        | 324             | 19.00           | MSA.....                   | 333           | 06/93        | 252             | 15.00           |
| Tampa-St. Petersburg-          |               |              |                 |                 | Wausau, WI MSA.....        | 334           | 09/93        | 220             | 14.00           |
| Clearwater, FL MSA.....        | 318           | 07/93        | 1) 652          | 45.00           | West Palm Beach-Boca       |               |              |                 |                 |
|                                |               |              | 2) 592          |                 | Raton-Delray Beach, FL     |               |              |                 |                 |
| Terre Haute, IN MSA.....       | 319           | 06/93        | 224             | 13.00           | MSA.....                   | 335           | 06/93        | 784             | 38.00           |
| Texarkana, TX-Texarkana, AR    |               |              |                 |                 | Wheeling, WV-OH MSA.....   | 336           | 09/93        | 248             | 15.00           |
| MSA.....                       | 320           | 09/93        | 268             | 16.00           | Wichita, KS MSA.....       | 337           | 06/93        | 380             | 21.00           |
| Toledo, OH MSA.....            | 321           | 09/93        | 448             | 27.00           | Wichita Falls, TX MSA..... | 338           | 08/93        | 272             | 17.00           |
| Topeka, KS MSA.....            | 322           | 06/93        | 260             | 15.00           | Williamsport, PA MSA.....  | 339           | 09/93        | 208             | 13.00           |
| Tucson, AZ MSA.....            | 323           | 05/93        | 560             | 32.00           | Wilmington, NC MSA.....    | 340           | 09/93        | 248             | 15.00           |
| Tulsa, OK MSA.....             | 324           | 09/93        | 636             | 39.00           | Worcester, MA MSA.....     | 341           | 08/93        | 304             | 19.00           |
| Tuscaloosa, AL MSA.....        | 325           | 05/93        | 288             | 16.00           | Yakima, WA MSA.....        | 342           | 09/93        | 296             | 18.00           |
| Tyler, TX MSA.....             | 326           | 09/93        | 276             | 17.00           | York, PA MSA.....          | 343           | 09/93        | 300             | 19.00           |
| Utica-Rome, NY MSA.....        | 327           | 09/93        | 284             | 17.00           | Youngstown-Warren, OH      |               |              |                 |                 |
| Victoria, TX MSA.....          | 328           | 09/93        | 244             | 15.00           | MSA.....                   | 344           | 09/93        | 432             | 26.00           |
| Visalia-Tulare-Porterville, CA |               |              |                 |                 | Yuba City, CA MSA.....     | 345           | 09/93        | 288             | 17.00           |
| MSA.....                       | 329           | 09/93        | 412             | 25.00           | Yuma, AZ MSA.....          | 346           | 05/93        | 276             | 16.00           |
| Waco, TX MSA.....              | 330           | 09/93        | 332             | 20.00           |                            |               |              |                 |                 |
| Washington, DC-MD-VA MSA.      | 331           | 09/93        | 1) 808          | 62.00           |                            |               |              |                 |                 |
|                                |               |              | 2) 856          |                 |                            |               |              |                 |                 |
|                                |               |              | 3) 888          |                 |                            |               |              |                 |                 |

NA Not assigned.

Series CPH-4, -5 Reports

| Geographic area           | Report number | 1990 CPH-4, Population and Housing Characteristics for Congressional Districts of the 103rd Congress |                 |                 | 1990 CPH-5, Summary Social, Economic, and Housing Characteristics |                 |                 |
|---------------------------|---------------|--|-----------------|-----------------|---|-----------------|-----------------|
|                           |               | Release date   | Number of pages | Price (dollars) | Release date  | Number of pages | Price (dollars) |
| U.S. Summary.....         | 1             | (NA)   | (NA)            | (NA)            | 02/93   | 700             | 37.00           |
| Alabama.....              | 2             | 02/93  | 204             | 12.00           | 07/92   | 345             | 18.00           |
| Alaska.....               | 3             | 01/93  | 176             | 11.00           | 06/92   | 262             | 14.00           |
| Arizona.....              | 4             | 04/93  | 204             | 12.00           | 07/92   | 212             | 11.00           |
| Arkansas.....             | 5             | 01/93  | 188             | 11.00           | 08/92   | 460             | 26.00           |
| California.....           | 6             | 03/93  | 536             | 31.00           | 08/92   | 464             | 26.00           |
| Colorado.....             | 7             | 02/93  | 204             | 12.00           | 07/92   | 276             | 14.00           |
| Connecticut.....          | 8             | 01/93  | 208             | 12.00           | 06/92   | 210             | 11.00           |
| Delaware.....             | 9             | 01/93  | 164             | 10.00           | 07/92   | 168             | 10.00           |
| District of Columbia..... | 10            | 01/93  | 164             | 10.00           | 07/92   | 156             | 9.00            |
| Florida.....              | 11            | 03/93  | 436             | 19.00           | 06/92   | 408             | 20.00           |
| Georgia.....              | 12            | 04/93  | 284             | 16.00           | 07/92   | 436             | 21.00           |
| Hawaii.....               | 13            | 02/93  | 168             | 11.00           | 06/92   | 174             | 10.00           |
| Idaho.....                | 14            | 01/93  | 172             | 11.00           | 07/92   | 232             | 14.00           |
| Illinois.....             | 15            | 02/93  | 352             | 20.00           | 08/92   | 776             | 38.00           |
| Indiana.....              | 16            | 02/93  | 240             | 14.00           | 07/92   | 452             | 22.00           |
| Iowa.....                 | 17            | 01/93  | 192             | 12.00           | 08/92   | 620             | 36.00           |
| Kansas.....               | 18            | 01/93  | 192             | 12.00           | 07/92   | 496             | 24.00           |
| Kentucky.....             | 19            | 02/93  | 216             | 13.00           | 08/92   | 364             | 21.00           |
| Louisiana.....            | 20            | 02/93  | 240             | 14.00           | 07/92   | 380             | 19.00           |
| Maine.....                | 21            | 01/93  | 168             | 11.00           | 06/92   | 292             | 15.00           |
| Maryland.....             | 22            | 02/93  | 232             | 14.00           | 06/92   | 288             | 15.00           |
| Massachusetts.....        | 23            | 02/93  | 260             | 15.00           | 07/92   | 284             | 14.00           |
| Michigan.....             | 24            | 02/93  | 284             | 16.00           | 07/92   | 632             | 36.00           |
| Minnesota.....            | 25            | 03/93  | 224             | 13.00           | 08/92   | 848             | 38.00           |
| Mississippi.....          | 26            | 02/93  | 200             | 12.00           | 08/92   | 332             | 19.00           |
| Missouri.....             | 27            | 02/93  | 224             | 13.00           | 08/92   | 612             | 35.00           |
| Montana.....              | 28            | 01/93  | 168             | 10.00           | 06/92   | 215             | 12.00           |
| Nebraska.....             | 29            | 01/93  | 188             | 11.00           | 07/92   | 440             | 24.00           |
| Nevada.....               | 30            | 02/93  | 172             | 11.00           | 07/92   | 172             | 9.50            |
| New Hampshire.....        | 31            | 01/93  | 172             | 11.00           | 06/92   | 212             | 11.00           |
| New Jersey.....           | 32            | 03/93  | 296             | 17.00           | 07/92   | 329             | 17.00           |
| New Mexico.....           | 33            | 02/93  | 176             | 11.00           | 07/92   | 220             | 11.00           |
| New York.....             | 34            | 02/93  | 452             | 26.00           | 07/92   | 644             | 30.00           |
| North Carolina.....       | 35            | 03/93  | 300             | 18.00           | 07/92   | 488             | 24.00           |
| North Dakota.....         | 36            | 01/93  | 168             | 11.00           | 07/92   | 420             | 20.00           |
| Ohio.....                 | 37            | 03/93  | 312             | 18.00           | 07/92   | 616             | 30.00           |
| Oklahoma.....             | 38            | 01/93  | 200             | 12.00           | 08/92   | 376             | 21.00           |
| Oregon.....               | 39            | 02/93  | 196             | 12.00           | 07/92   | 260             | 13.00           |
| Pennsylvania.....         | 40            | 02/93  | 324             | 19.00           | 08/92   | 880             | 39.00           |
| Rhode Island.....         | 41            | 01/93  | 168             | 11.00           | 07/92   | 156             | 10.00           |
| South Carolina.....       | 42            | 02/93  | 208             | 13.00           | 08/92   | 288             | 14.00           |
| South Dakota.....         | 43            | 01/93  | 168             | 10.00           | 08/92   | 372             | 21.00           |
| Tennessee.....            | 44            | 02/93  | 228             | 14.00           | 07/92   | 340             | 19.00           |
| Texas.....                | 45            | 03/93  | 560             | 32.00           | 08/92   | 714             | 31.00           |
| Utah.....                 | 46            | 02/93  | 184             | 11.00           | 07/92   | 236             | 12.00           |
| Vermont.....              | 47            | 01/93  | 164             | 10.00           | 06/92   | 212             | 11.00           |
| Virginia.....             | 48            | 03/93  | 264             | 15.00           | 07/92   | 336             | 19.00           |
| Washington.....           | 49            | 02/93  | 236             | 14.00           | 07/92   | 304             | 16.00           |
| West Virginia.....        | 50            | 01/93  | 172             | 11.00           | 07/92   | 272             | 15.00           |
| Wisconsin.....            | 51            | 02/93  | 224             | 13.00           | 08/92   | 640             | 36.00           |
| Wyoming.....              | 52            | 01/93  | 164             | 10.00           | 08/92   | 192             | 12.00           |
| Puerto Rico.....          | 53            | (NA)   | (NA)            | (NA)            | 03/93   | 1,076           | 41.00           |
| Not assigned.....         | 54            | (NA)   | (NA)            | (NA)            | (NA)  | (NA)            | (NA)            |
| Virgin Islands.....       | 55            | (NA)   | (NA)            | (NA)            | 04/93   | 104             | 6.00            |

NA Not applicable.

1990 Census of Population CP-1, -2 Reports

| Geographic area                            | Report number | 1990 CP-1, General Population Characteristics |                            |                 | 1990 CP-2, Social and Economic Characteristics |  |                 |
|--|---------------|---|----------------------------|-----------------|--|--|-----------------|
|  |               | Release date                                  | Number of pages            | Price (dollars) | Release date                                   | Number of pages                          | Price (dollars) |
| U.S. Summary.....                          | 1             | 02/93   | 736                        | 37.00           | 03/94  | 598                                      | 37.00           |
| American Indian and Alaska Native Areas .. | 1A            | 12/92   | 631                        | 36.00           | 05/94  | 952<br>1,176                             | 44.00           |
| Metropolitan Areas.....                    | 1B            | 03/93   | 1) 884<br>2) 960           | 56.00           | (NA)   | (NA)                                     | (NA)            |
| Urbanized Areas.....                       | 1C            | 03/93   | 1) 864<br>2) 944<br>3) 720 | 53.00           | (NA)   | (NA)                                     | (NA)            |
| Alabama.....                               | 2             | 08/92   | 448                        | 25.00           | 11/93  | 952                                      | 43.00           |
| Alaska.....                                | 3             | 07/92   | 304                        | 16.00           | 12/93  | 716                                      | 40.00           |
| Arizona.....                               | 4             | 07/92   | 369                        | 21.00           | 11/93  | 724                                      | 40.00           |
| Arkansas.....                              | 5             | 07/92   | 374                        | 19.00           | 11/93  | 788                                      | 41.00           |
| California.....                            | 6             | 10/92   | 1) 693<br>2) 702<br>3) 715 | 50.00           | 12/93  | 1) 1,060<br>2) 1,160<br>3) 992<br>4) 914 | 98.00           |
| Colorado.....                              | 7             | 08/92   | 460                        | 26.00           | 12/93  | 908                                      | 42.00           |
| Connecticut.....                           | 8             | 09/92   | 476                        | 27.00           | 12/93  | 942                                      | 43.00           |
| Delaware.....                              | 9             | 07/92   | 188                        | 10.00           | 11/93  | 396                                      | 24.00           |
| District of Columbia.....                  | 10            | 07/92   | 164                        | 9.00            | 11/93  | 368                                      | 22.00           |
| Florida.....                               | 11            | 09/92   | 1) 600<br>2) 600           | 41.00           | 10/93  | 1) 772<br>2) 772<br>3) 696               | 54.00           |
| Georgia.....                               | 12            | 09/92   | 708                        | 37.00           | 01/94  | 1) 734<br>2) 773                         | 48.00           |
| Hawaii.....                                | 13            | 08/92   | 328                        | 20.00           | 11/93  | 604                                      | 37.00           |
| Idaho.....                                 | 14            | 10/92   | 284                        | 16.00           | 11/93  | 564                                      | 34.00           |
| Illinois.....                              | 15            | 08/92   | 880                        | 39.00           | 12/93  | 1) 888<br>2) 876                         | 51.00           |
| Indiana.....                               | 16            | 07/92   | 468                        | 23.00           | 01/94  | 940                                      | 43.00           |
| Iowa.....                                  | 17            | 10/92   | 388                        | 22.00           | 12/93  | 804                                      | 41.00           |
| Kansas.....                                | 18            | 08/92   | 448                        | 25.00           | 12/93  | 896                                      | 42.00           |
| Kentucky.....                              | 19            | 10/92   | 425                        | 24.00           | 12/93  | 904                                      | 42.00           |
| Louisiana.....                             | 20            | 07/92   | 502                        | 25.00           | 12/93  | 1) 480<br>2) 588                         | 44.00           |
| Maine.....                                 | 21            | 08/92   | 292                        | 16.00           | 12/93  | 592                                      | 37.00           |
| Maryland.....                              | 22            | 08/92   | 532                        | 31.00           | 12/93  | 1) 580<br>2) 504                         | 45.00           |
| Massachusetts.....                         | 23            | 08/92   | 612                        | 35.00           | 12/93  | 1) 668<br>2) 636                         | 47.00           |
| Michigan.....                              | 24            | 10/92   | 980                        | 40.00           | 01/94  | 1) 970<br>906                            | 52.00           |
| Minnesota.....                             | 25            | 08/92   | 528                        | 31.00           | 01/94  | 964                                      | 43.00           |
| Mississippi.....                           | 26            | 07/92   | 412                        | 20.00           | 12/93  | 908                                      | 42.00           |
| Missouri.....                              | 27            | 07/92   | 520                        | 29.00           | 01/94  | 1) 536<br>2) 564                         | 45.00           |
| Montana.....                               | 28            | 07/92   | 264                        | 10.00           | 12/93  | 568                                      | 35.00           |
| Nebraska.....                              | 29            | 08/92   | 324                        | 20.00           | 01/94  | 680                                      | 40.00           |
| Nevada.....                                | 30            | 08/92   | 276                        | 16.00           | 10/93  | 536                                      | 33.00           |
| New Hampshire.....                         | 31            | 07/92   | 253                        | 13.00           | 11/93  | 548                                      | 34.00           |
| New Jersey.....                            | 32            | 09/92   | 1) 492<br>2) 652           | 41.00           | 01/94  | 1) 696<br>2) 683<br>3) 763               | 55.00           |
| New Mexico.....                            | 33            | 07/92   | 356                        | 18.00           | 01/94  | 772                                      | 41.00           |
| New York.....                              | 34            | 07/92   | 1) 704<br>2) 794           | 45.00           | 12/93  | 1) 964<br>2) 976<br>3) 880               | 61.00           |
| North Carolina.....                        | 35            | 08/92   | 612                        | 35.00           | 12/93  | 1) 580<br>2) 672                         | 46.00           |
| North Dakota.....                          | 36            | 08/92   | 264                        | 15.00           | 11/93  | 496                                      | 31.00           |
| Ohio.....                                  | 37            | 09/92   | 716                        | 37.00           | 01/94  | 1) 782<br>2) 674                         | 48.00           |

1990 Census of Population CP-1, -2 Reports—Continued

| Geographic area                             | Report number | 1990 CP-1, <i>General Population Characteristics</i> |                  |                 | 1990 CP-2, <i>Social and Economic Characteristics</i> |                                  |                 |
|---|---------------|--|------------------|-----------------|---|----------------------------------|-----------------|
|   |               | Release date   | Number of pages  | Price (dollars) | Release date  | Number of pages                  | Price (dollars) |
| Oklahoma.....                               | 38            | 07/92  | 502              | 30.00           | 12/93   | 976                              | 43.00           |
| Oregon.....                                 | 39            | 08/92  | 392              | 19.00           | 01/94   | 772                              | 41.00           |
| Pennsylvania.....                           | 40            | 10/92  | 1) 516<br>2) 672 | 42.00           | 01/94   | 1) 824<br>2) 832<br>3) 699       | 57.00           |
| Rhode Island.....                           | 41            | 08/92  | 232              | 14.00           | 11/93   | 484                              | 30.00           |
| South Carolina.....                         | 42            | 10/93  | 408              | 23.00           | 12/93   | 844                              | 41.00           |
| South Dakota.....                           | 43            | 08/92  | 284              | 16.00           | 12/93   | 564                              | 34.00           |
| Tennessee.....                              | 44            | 08/92  | 440              | 26.00           | 01/94   | 920                              | 42.00           |
| Texas.....                                  | 45            | 08/92  | 1) 684<br>2) 868 | 45.00           | 01/94   | 1) 1,100<br>2) 1,100<br>3) 1,024 | 65.00           |
| Utah.....                                   | 46            | 09/92  | 320              | 18.00           | 01/94   | 640                              | 39.00           |
| Vermont.....                                | 47            | 08/92  | 228              | 13.00           | 10/93   | 460                              | 28.00           |
| Virginia.....                               | 48            | 09/92  | 668              | 37.00           | 11/93   | 1) 692<br>2) 724                 | 47.00           |
| Washington.....                             | 49            | 08/92  | 584              | 33.00           | 12/93   | 1) 588<br>2) 536                 | 45.00           |
| West Virginia.....                          | 50            | 08/92  | 276              | 13.00           | 11/93   | 580                              | 35.00           |
| Wisconsin.....                              | 51            | 08/92  | 568              | 32.00           | 01/94   | 1) 540<br>2) 534                 | 45.00           |
| Wyoming.....                                | 52            | 08/92  | 232              | 14.00           | 11/93   | 456                              | 29.00           |
| Puerto Rico (English & Spanish version).... | 53            | 12/93  | 948              | 40.00           | 01/94   | 1) 1,118<br>2) 1,043             | 53.00           |
| Not assigned.....                           | 54            | (NA)   | (NA)             | (NA)            | (NA)  | (NA)                             | (NA)            |
| Virgin Islands.....                         | 55            | 11/92  | 200              | 12.00           | 01/94   | 572                              | 35.00           |

NA Not applicable.

**Series CP-3, Population Subject Reports**

| Title  | Report number | Release date | Number of pages | Price (dollars) |
|--|---------------|--------------|-----------------|-----------------|
| The Foreign Born Population in the United States (see SSTF 1) .....                                    | 1             | 09/93        | 512             | 32.00           |
| Ancestry of the Population in the United States (see SSTF 2) .....                                     | 2             | 01/94        | 744             | 41.00           |
| Persons of Hispanic Origin in the United States (see SSTF 3) .....                                     | 3             | 01/94        | 356             | 23.00           |
| Education in the United States (SSTF 6) .....  | 4             | 04/94        | 832             | 41.00           |
| Characteristics of the Asian and Pacific Islander Population in the United States (SSTF 5) .....       | 5             | 01/94        | 336             | 21.00           |
| Characteristics of the Black Population in the United States (SSTF 21) .....                           | 6             | Due 1994     |                 |                 |
| Characteristics of American Indians by Tribe and Language for Selected Areas (SSTF 13) .....           | 7             | Due 1994     |                 |                 |
| Earnings by Occupation and Education (see SSTF 22) .....   |               | Cancelled    |                 |                 |
| Current Language of the American People (see SSTF 11) .....  |               | Cancelled    |                 |                 |
| Occupation by Industry (see SSTF 14) .....   |               | Cancelled    |                 |                 |
| Geographical Mobility for Metropolitan Areas (SSTF 15) .....   |               | Cancelled    |                 |                 |
| Journey to Work in the United States (SSTF 20) .....   |               | Cancelled    |                 |                 |
| Characteristics of the Urban, Rural and Farm Population .....  |               | Cancelled    |                 |                 |
| Geographical Mobility for States and the Nation (see SSTF 4) .....                                     |               | Cancelled    |                 |                 |
| Poverty Areas in the United States (SSTF 17) .....   |               | Cancelled    |                 |                 |
| Recent and Lifetime Migration .....  |               | Cancelled    |                 |                 |
| Journey to Work: Metropolitan Commuting Flows .....  |               | Cancelled    |                 |                 |
| Journey to Work: Characteristics of the Workers in Metropolitan Areas .....                            |               | Cancelled    |                 |                 |
| Place of Work .....  |               | Cancelled    |                 |                 |
| Detailed Social and Economic Characteristics of the Population .....                                   |               | Cancelled    |                 |                 |
| Education .....  |               | Cancelled    |                 |                 |
| The Older Population of the United States (see SSTF 19) .....  |               | Cancelled    |                 |                 |
| Persons in Institutions and Other Group Quarters .....   |               | Cancelled    |                 |                 |
| Households, Families, Marital Status, and Living Arrangements .....                                    |               | Cancelled    |                 |                 |
| Fertility (see SSTF 16) .....  |               | Cancelled    |                 |                 |
| American Indians, Eskimos, and Aleuts in the United States .....                                       |               | Cancelled    |                 |                 |
| Employment Status, Work Experience, and Veteran Status (see SSTF 20) .....                             |               | Cancelled    |                 |                 |
| Occupational Characteristics .....   |               | Cancelled    |                 |                 |
| Industrial Characteristics .....   |               | Cancelled    |                 |                 |
| Sources and Structure of Household and Family Income .....   |               | Cancelled    |                 |                 |
| Characteristics of Persons in Poverty .....  |               | Cancelled    |                 |                 |
| Characteristics of Adults with Work Disabilities, Mobility Limitations, or Self-Care Limitations ..... |               | Cancelled    |                 |                 |

Series CH-1,-2 Reports

| Geographic area                             | Report number | 1990 CH-1, General Housing Characteristics |                 |                 | 1990 CH-2, Detailed Housing Characteristics |                 |                 |
|---|---------------|--|-----------------|-----------------|---|-----------------|-----------------|
|   |               | Release date                               | Number of pages | Price (dollars) | Release date                                | Number of pages | Price (dollars) |
| U.S. Summary.....                           | 1             | 03/93                                      | 557             | 25.00           | 03/94                                       | 694             | 43.00           |
| American Indian & Alaska Native Areas ..... | 1A            | 04/93                                      | 601             | 35.00           | 03/94                                       | 780             | 44.00           |
| Metropolitan Areas.....                     | 1B            | 03/93                                      | 1) 692          |                 | 05/94                                       | 888             |                 |
|   |               |  | 2) 764          | 50.00           |   | 820             | 66.00           |
|   |               |  | 3) 700          |                 |   | 916             |                 |
| Urbanized Areas.....                        | 1C            | 05/93                                      | 1) 712          |                 | 05/94                                       | 1) 1,028        |                 |
|   |               |  | 2) 623          | 50.00           |   | 2) 952          | 61.00           |
|   |               |  | 3) 743          |                 |   | 3) 868          |                 |
| Alabama.....                                | 2             | 09/92                                      | 352             | 20.00           | 10/93                                       | 420             | 25.00           |
| Alaska.....                                 | 3             | 11/92                                      | 244             | 14.00           | 09/93                                       | 314             | 24.00           |
| Arizona.....                                | 4             | 09/92                                      | 304             | 18.00           | 10/93                                       | 352             | 21.00           |
| Arkansas.....                               | 5             | 09/92                                      | 312             | 19.00           | 11/93                                       | 372             | 22.00           |
| California.....                             | 6             | 11/92                                      | 1) 905          |                 | 11/93                                       | 1) 976          |                 |
|   |               |  | 2) 767          | 46.00           |   | 2) 896          | 51.00           |
| Colorado.....                               | 7             | 09/92                                      | 372             | 21.00           | 10/93                                       | 444             | 27.00           |
| Connecticut.....                            | 8             | 10/92                                      | 391             | 22.00           | 10/93                                       | 438             | 26.00           |
| Delaware.....                               | 9             | 09/92                                      | 172             | 11.00           | 09/93                                       | 228             | 14.00           |
| District of Columbia.....                   | 10            | 10/92                                      | 156             | 10.00           | 11/93                                       | 228             | 14.00           |
| Florida.....                                | 11            | 09/92                                      | 869             | 39.00           | 09/93                                       | 924             | 41.00           |
| Georgia.....                                | 12            | 09/92                                      | 532             | 37.00           | 01/94                                       | 624             | 38.00           |
| Hawaii.....                                 | 13            | 10/92                                      | 280             | 16.00           | 09/93                                       | 324             | 20.00           |
| Idaho.....                                  | 14            | 09/92                                      | 232             | 14.00           | 09/93                                       | 296             | 18.00           |
| Illinois.....                               | 15            | 09/92                                      | 716             | 37.00           | 09/93                                       | 724             | 40.00           |
| Indiana.....                                | 16            | 09/92                                      | 392             | 22.00           | 10/93                                       | 432             | 26.00           |
| Iowa.....                                   | 17            | 09/92                                      | 328             | 20.00           | 11/93                                       | 380             | 23.00           |
| Kansas.....                                 | 18            | 09/92                                      | 368             | 21.00           | 10/93                                       | 416             | 23.00           |
| Kentucky.....                               | 19            | 09/92                                      | 335             | 19.00           | 10/93                                       | 420             | 25.00           |
| Louisiana.....                              | 20            | 10/92                                      | 404             | 23.00           | 10/93                                       | 456             | 27.00           |
| Maine.....                                  | 21            | 11/92                                      | 260             | 15.00           | 10/93                                       | 272             | 17.00           |
| Maryland.....                               | 22            | 10/92                                      | 432             | 24.00           | 10/92                                       | 474             | 30.00           |
| Massachusetts.....                          | 23            | 10/92                                      | 516             | 30.00           | 10/93                                       | 548             | 34.00           |
| Michigan.....                               | 24            | 09/92                                      | 806             | 38.00           | 11/93                                       | 700             | 40.00           |
| Minnesota.....                              | 25            | 09/92                                      | 452             | 27.00           | 09/93                                       | 446             | 27.00           |
| Mississippi.....                            | 26            | 10/92                                      | 320             | 18.00           | 10/93                                       | 408             | 24.00           |
| Missouri.....                               | 27            | 10/92                                      | 424             | 24.00           | 10/93                                       | 474             | 30.00           |
| Montana.....                                | 28            | 09/92                                      | 224             | 13.00           | 09/93                                       | 292             | 18.00           |
| Nebraska.....                               | 29            | 09/92                                      | 272             | 15.00           | 10/93                                       | 344             | 21.00           |
| Nevada.....                                 | 30            | 09/92                                      | 225             | 14.00           | 10/93                                       | 284             | 17.00           |
| New Hampshire.....                          | 31            | 10/92                                      | 225             | 14.00           | 10/93                                       | 268             | 16.00           |
| New Jersey.....                             | 32            | 10/92                                      | 895             | 39.00           | 09/93                                       | 884             | 42.00           |
| New Mexico.....                             | 33            | 10/92                                      | 288             | 16.00           | 11/93                                       | 376             | 23.00           |
| New York.....                               | 34            | 10/92                                      | 1) 548          |                 | 10/93                                       | 1) 520          |                 |
|   |               |  | 2) 860          | 42.00           |   | 2) 592          | 44.00           |
| North Carolina.....                         | 35            | 09/92                                      | 480             | 27.00           | 10/93                                       | 520             | 32.00           |
| North Dakota.....                           | 36            | 10/92                                      | 224             | 13.00           | 09/93                                       | 272             | 17.00           |
| Ohio.....                                   | 37            | 10/92                                      | 592             | 34.00           | 10/93                                       | 592             | 35.00           |
| Oklahoma.....                               | 38            | 10/92                                      | 404             | 23.00           | 09/93                                       | 448             | 27.00           |
| Oregon.....                                 | 39            | 10/92                                      | 332             | 19.00           | 10/93                                       | 368             | 22.00           |
| Pennsylvania.....                           | 40            | 09/92                                      | 1) 458          |                 | 10/93                                       | 804             | 41.00           |
|   |               |  | 2) 559          | 40.00           |   |                 |                 |
| Rhode Island.....                           | 41            | 10/92                                      | 204             | 12.00           | 10/93                                       | 260             | 23.00           |
| South Carolina.....                         | 42            | 10/92                                      | 324             | 19.00           | 10/93                                       | 376             | 32.00           |
| South Dakota.....                           | 43            | 10/92                                      | 232             | 14.00           | 10/93                                       | 300             | 19.00           |
| Tennessee.....                              | 44            | 09/92                                      | 352             | 20.00           | 10/93                                       | 424             | 25.00           |
| Texas.....                                  | 45            | 11/92                                      | 1) 585          |                 | 10/93                                       | 1) 780          |                 |
|   |               |  | 2) 611          | 42.00           |   | 2) 568          | 46.00           |
| Utah.....                                   | 46            | 10/92                                      | 262             | 15.00           | 10/93                                       | 316             | 19.00           |
| Vermont.....                                | 47            | 09/92                                      | 204             | 12.00           | 09/93                                       | 240             | 15.00           |
| Virginia.....                               | 48            | 10/92                                      | 520             | 30.00           | 09/93                                       | 620             | 38.00           |
| Washington.....                             | 49            | 11/92                                      | 472             | 29.00           | 10/93                                       | 484             | 29.00           |
| West Virginia.....                          | 50            | 11/92                                      | 236             | 14.00           | 10/93                                       | 296             | 18.00           |

**Series CH-1,-2 Reports—Continued**

| Geographic area     | Report number | 1990 CH-1, <i>General Housing Characteristics</i> |                 |                 | 1990 CH-2, <i>Detailed Housing Characteristics</i> |                 |                 |
|---------------------|---------------|---|-----------------|-----------------|--|-----------------|-----------------|
|                     |               | Release date                                      | Number of pages | Price (dollars) | Release date                                       | Number of pages | Price (dollars) |
| Wisconsin.....      | 51            | 11/92   | 488             | 27.00           | 10/93  | 448             | 27.00           |
| Wyoming.....        | 52            | 10/92   | 196             | 12.00           | 10/93  | 252             | 15.00           |
| Puerto Rico.....    | 53            | 02/93   | 975             | 40.00           | 03/94  | 634             | 39.00           |
| Not assigned.....   | 54            | (NA)  | (NA)            | (NA)            | (NA)   | (NA)            | (NA)            |
| Virgin Islands..... | 55            | 02/93   | 156             | 10.00           | 12/93  | 236             | 14.00           |

NA Not applicable.

**Series CH-3, Housing Subject Reports**

| Title  | Report number | Release date | Number of pages | Price (dollars) |
|--|---------------|--------------|-----------------|-----------------|
| Metropolitan Housing Characteristics (See SSTF 7)..... | 1             | 4/94         | 432             | \$25.00         |
| Housing of the Elderly (see SSTF 8).....               |               | Cancelled    |                 |                 |
| Housing Characteristics of New Units (see SSTF 9)..... |               | Cancelled    |                 |                 |
| Mobile Homes (see SSTF 10).....                        |               | Cancelled    |                 |                 |
| Condominium Housing (see SSTF 18).....                 |               | Cancelled    |                 |                 |
| Structural Characteristics.....                        |               | Cancelled    |                 |                 |
| Utilization of the Housing Stock.....                  |               | Cancelled    |                 |                 |
| Housing Quality Indicators.....                        |               | Cancelled    |                 |                 |
| Second Mortgage Households.....                        |               | Cancelled    |                 |                 |
| Recent Mover Households.....                           |               | Cancelled    |                 |                 |



**File Size and Release Schedule for Selected 1990 Machine-Readable Products  
Public Law 94-171 Tape File**

| Geographic area           | Size<br>in mb | Release date |        | Geographic area                | Size<br>in mb | Release date |        |
|---------------------------|---------------|--------------|--------|--------------------------------|---------------|--------------|--------|
|                           |               | Tapes        | CD-ROM |                                |               | Tapes        | CD-ROM |
| Alabama .....             | 81.4          | 02/91        | 03/91  | Montana .....                  | 30.3          | 02/91        | 02/91  |
| Alaska .....              | 9.2           | 03/91        | 03/91  | Nebraska.....                  | 54.1          | 02/91        | 03/91  |
| Arizona .....             | 52.6          | 03/91        | 03/91  | Nevada .....                   | 16.5          | 02/91        | 02/91  |
| Arkansas.....             | 60.0          | 02/91        | 02/91  | New Hampshire.....             | 18.3          | 03/91        | 03/91  |
| California.....           | 218.0         | 03/91        | 03/91  | New Jersey.....                | 72.0          | 02/91        | 02/91  |
| Colorado .....            | 58.5          | 03/91        | 03/91  | New Mexico .....               | 34.4          | 03/91        | 03/91  |
| Connecticut.....          | 28.4          | 02/91        | 03/91  | New York .....                 | 156.6         | 02/91        | 03/91  |
| Delaware.....             | 8.0           | 02/91        | 03/91  | North Carolina .....           | 106.5         | 02/91        | 03/91  |
| District of Columbia..... | 3.1           | 02/91        | 03/91  | North Dakota .....             | 41.3          | 03/91        | 03/91  |
| Florida .....             | 157.7         | 03/91        | 03/91  | Ohio .....                     | 130.4         | 02/91        | 03/91  |
| Georgia .....             | 98.5          | 03/91        | 03/91  | Oklahoma .....                 | 80.7          | 02/91        | 03/91  |
| Hawaii .....              | 7.4           | 02/91        | 02/91  | Oregon.....                    | 51.8          | 02/91        | 03/91  |
| Idaho .....               | 29.1          | 03/91        | 03/91  | Pennsylvania .....             | 172.8         | 02/91        | 03/91  |
| Illinois.....             | 145.9         | 02/91        | 03/91  | Rhode Island .....             | 10.8          | 02/91        | 03/91  |
| Indiana.....              | 97.0          | 02/91        | 02/91  | South Carolina .....           | 68.7          | 03/91        | 03/91  |
| Iowa .....                | 73.0          | 02/91        | 03/91  | South Dakota .....             | 34.3          | 02/91        | 02/91  |
| Kansas.....               | 80.8          | 02/91        | 03/91  | Tennessee .....                | 86.1          | 03/91        | 03/91  |
| Kentucky.....             | 63.4          | 03/91        | 03/91  | Texas.....                     | 263.6         | 02/91        | 02/91  |
| Louisiana.....            | 69.5          | 02/91        | 02/91  | Utah .....                     | 22.6          | 03/91        | 03/91  |
| Maine.....                | 27.8          | 03/91        | 03/91  | Vermont.....                   | 12.3          | 02/91        | 02/91  |
| Maryland.....             | 36.6          | 02/91        | 03/91  | Virginia.....                  | 76.2          | 02/91        | 02/91  |
| Massachusetts.....        | 57.8          | 03/91        | 03/91  | Washington.....                | 69.2          | 03/91        | 03/91  |
| Michigan .....            | 126.6         | 03/91        | 03/91  | West Virginia .....            | 36.3          | 03/91        | 03/91  |
| Minnesota.....            | 86.7          | 02/91        | 03/91  | Wisconsin.....                 | 89.8          | 03/91        | 03/91  |
| Mississippi.....          | 55.1          | 02/91        | 02/91  | Wyoming.....                   | 26.8          | 02/91        | 02/91  |
| Missouri.....             | 97.9          | 02/91        | 02/91  | Puerto Rico <sup>1</sup> ..... | (NA)          | (NA)         | (NA)   |
|                           |               |              |        | Virgin Island .....            | (NA)          | (NA)         | (NA)   |

NA Not applicable. <sup>1</sup>See STF 1.

Data Files Summary Tape File (STF) 1A

Reel/cartridge

| Geographic area      | Size in mb | Release date | Geographic area         | Size in mb | Release date |
|----------------------|------------|--------------|-------------------------|------------|--------------|
| Alabama              | 144        | 04/91        | Nebraska                | 105        | 05/91        |
| Alaska               | 26         | 04/91        | Nevada                  | 27         | 04/91        |
| Arizona              | 105        | 05/91        | New Hampshire           | 29         | 05/91        |
| Arkansas             | 142        | 04/91        | New Jersey              | 195        | 05/91        |
| California           | 664        | 05/91        | New Mexico              | 57         | 05/91        |
| Colorado             | 117        | 04/91        | New York                | 478        | 05/91        |
| Connecticut          | 81         | 04/91        | North Carolina          | 249        | 05/91        |
| Delaware             | 18         | 05/91        | North Dakota            | 82         | 05/91        |
| District of Columbia | 16         | 05/91        | Ohio                    | 386        | 05/91        |
| Florida              | 291        | 05/91        | Oklahoma                | 136        | 05/91        |
| Georgia              | 181        | 05/91        | Oregon                  | 95         | 04/91        |
| Hawaii               | 19         | 05/91        | Pennsylvania            | 364        | 05/91        |
| Idaho                | 43         | 04/91        | Rhode Island            | 25         | 05/91        |
| Illinois             | 446        | 05/91        | South Carolina          | 111        | 05/91        |
| Indiana              | 212        | 05/91        | South Dakota            | 66         | 05/91        |
| Iowa                 | 171        | 05/91        | Tennessee               | 149        | 05/91        |
| Kansas               | 145        | 06/91        | Texas                   | 524        | 05/91        |
| Kentucky             | 127        | 04/91        | Utah                    | 53         | 04/91        |
| Louisiana            | 173        | 04/91        | Vermont                 | 20         | 05/91        |
| Maine                | 42         | 05/91        | Virginia                | 165        | 04/91        |
| Maryland             | 124        | 05/91        | Washington              | 152        | 05/91        |
| Massachusetts        | 149        | 05/91        | West Virginia           | 79         | 05/91        |
| Michigan             | 325        | 05/91        | Wisconsin               | 220        | 05/91        |
| Minnesota            | 216        | 06/91        | Wyoming                 | 28         | 04/91        |
| Mississippi          | 118        | 04/91        | Puerto Rico             | 70         | 08/91        |
| Missouri             | 242        | 04/91        | Virgin Islands          | 18         | 08/91        |
| Montana              | 38         | 05/91        | Pacific outlying areas* | (NA)       | 07/92        |

\*Also on diskette. NA Not available.

Compact disc—read-only memory (CD-ROM)

| Geographic area  | Release date | Geographic area  | Release date |
|--|--------------|--|--------------|
| <b>New England</b>   |              | (Vol. 2) North Carolina, South Carolina                              | 10/91        |
| Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont    | 10/91        | (Vol. 3) Florida, Georgia  | 11/91        |
| <b>Middle Atlantic</b>   |              | <b>East South Central</b>  |              |
| (Vol. 1) New York  | 10/91        | Alabama, Kentucky, Mississippi, Tennessee                            | 10/91        |
| (Vol. 2) New Jersey, Pennsylvania  | 10/91        | <b>West South Central</b>  |              |
| <b>East North Central</b>  |              | (Vol. 1) Arkansas, Louisiana, Oklahoma                               | 10/91        |
| (Vol. 1) Indiana, Ohio   | 10/91        | (Vol. 2) Texas   | 10/91        |
| (Vol. 2) Illinois  | 10/91        | <b>Mountain</b>  |              |
| (Vol. 3) Michigan, Wisconsin   | 10/91        | Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming | 10/91        |
| <b>West North Central</b>  |              | <b>Pacific</b>   |              |
| (Vol. 1) Minnesota, Missouri, South Dakota                                 | 10/91        | (Vol. 1) Alaska, Hawaii, Oregon, Washington                          | 10/91        |
| (Vol. 2) Iowa, Kansas, Nebraska, North Dakota                              | 10/91        | (Vol. 2) California  | 10/91        |
| <b>South Atlantic</b>  |              | <b>Puerto Rico (including "redistricting data")</b>                  | 04/92        |
| (Vol. 1) Delaware, District of Columbia, Maryland, Virginia, West Virginia | 10/91        | <b>Virgin Islands (combined with STF 3)</b>                          | —            |

## Summary Tape File (STF) 1B

Reel/cartridge

| Geographic area            | Size in mb | Release date | Geographic area      | Size in mb | Release date |
|----------------------------|------------|--------------|----------------------|------------|--------------|
| Alabama .....              | 1,752      | 09/91        | Montana .....        | 617        | 09/91        |
| Alaska .....               | 186        | 10/91        | Nebraska .....       | 1,154      | 09/91        |
| Arizona .....              | 1,074      | 09/91        | Nevada .....         | 327        | 09/91        |
| Arkansas .....             | 1,403      | 10/91        | New Hampshire .....  | 352        | 10/91        |
| California .....           | 4,410      | 10/91        | New Jersey .....     | 1,395      | 09/91        |
| Colorado .....             | 1,220      | 09/91        | New Mexico .....     | 816        | 10/91        |
| Connecticut .....          | 567        | 09/91        | New York .....       | 3,108      | 10/91        |
| Delaware .....             | 163        | 09/91        | North Carolina ..... | 2,359      | 09/91        |
| District of Columbia ..... | 65         | 10/91        | North Dakota .....   | 886        | 10/91        |
| Florida .....              | 3,193      | 10/91        | Ohio .....           | 2,757      | 10/91        |
| Georgia .....              | 2,083      | 10/91        | Oklahoma .....       | 1,673      | 09/91        |
| Hawaii .....               | 147        | 09/91        | Oregon .....         | 1,082      | 09/91        |
| Idaho .....                | 595        | 09/91        | Pennsylvania .....   | 3,342      | 10/91        |
| Illinois .....             | 3,248      | 09/91        | Rhode Island .....   | 211        | 10/91        |
| Indiana .....              | 2,038      | 09/91        | South Carolina ..... | 1,417      | 10/91        |
| Iowa .....                 | 1,604      | 09/91        | South Dakota .....   | 736        | 09/91        |
| Kansas .....               | 1,690      | 09/91        | Tennessee .....      | 1,764      | 10/91        |
| Kentucky .....             | 1,320      | 10/91        | Texas .....          | 5,442      | 10/91        |
| Louisiana .....            | 1,504      | 09/91        | Utah .....           | 484        | 10/91        |
| Maine .....                | 533        | 10/91        | Vermont .....        | 239        | 09/91        |
| Maryland .....             | 831        | 09/91        | Virginia .....       | 1,551      | 09/91        |
| Massachusetts .....        | 1,137      | 10/91        | Washington .....     | 1,383      | 10/91        |
| Michigan .....             | 2,604      | 10/91        | West Virginia .....  | 766        | 10/91        |
| Minnesota .....            | 1,878      | 09/91        | Wisconsin .....      | 1,984      | 10/91        |
| Missouri .....             | 2,168      | 09/91        | Wyoming .....        | 538        | 09/91        |
| Mississippi .....          | 1,222      | 09/91        | Puerto Rico .....    | 454        | 11/91        |
|                            |            |              | Virgin Islands ..... | 102        | 11/91        |

### STF1B extract on compact disc—read-only memory (CD-ROM)

| Geographic area  | Release date | Geographic area  | Release date |
|--|--------------|--|--------------|
| <b>New England</b><br>Connecticut, Maine, Massachusetts, New<br>Hampshire, Rhode Island, Vermont ..... | 03/92        | <b>South Atlantic</b><br>Delaware, District of Columbia, Florida, Georgia,<br>Maryland, North Carolina, South Carolina, Virginia,<br>West Virginia ..... | 11/92        |
| <b>Middle Atlantic</b><br>New Jersey, New York, Pennsylvania .....                                     | 03/92        | <b>East South Central</b><br>Alabama, Kentucky, Mississippi, Tennessee .....   | 11/93        |
| <b>East North Central</b><br>(Vol. 1) Indiana, Michigan, Ohio .....                                    | 10/92        | <b>West South Central</b><br>Arkansas, Louisiana, Oklahoma, Texas .....  | 10/92        |
| (Vol. 2) Illinois, Wisconsin .....   | 10/92        | <b>Mountain</b><br>Arizona, Colorado, Idaho, Montana, Nevada,<br>New Mexico, Utah, Wyoming .....   | 09/92        |
| <b>West North Central</b><br>Iowa, Kansas, Minnesota, Missouri, Nebraska,<br>North Dakota .....        | 11/93        | <b>Pacific</b><br>Alaska, California, Hawaii, Oregon, Washington .....   | 09/92        |

Summary Tape Files (STF) 2-A, 2-B

| Geographic area            | STF 2-A    |              | STF 2-B    |              |
|----------------------------|------------|--------------|------------|--------------|
|                            | Size in mb | Release date | Size in mb | Release date |
| Alabama .....              | 311        | 10/91        | 174        | 11/91        |
| Alaska .....               | 51         | 10/91        | 102        | 11/91        |
| Arizona .....              | 227        | 10/91        | 89         | 11/91        |
| Arkansas .....             | 179        | 10/91        | 250        | 12/91        |
| California .....           | 1,698      | 11/91        | 476        | 11/91        |
| Colorado .....             | 274        | 10/91        | 127        | 11/91        |
| Connecticut .....          | 225        | 10/91        | 152        | 11/91        |
| Delaware .....             | 47         | 10/91        | 29         | 11/91        |
| District of Columbia ..... | 47         | 10/91        | 4          | 11/91        |
| Florida .....              | 753        | 11/91        | 317        | 11/91        |
| Georgia .....              | 434        | 10/91        | 273        | 11/91        |
| Hawaii .....               | 6          | 10/91        | 60         | 11/91        |
| Idaho .....                | 83         | 10/91        | 85         | 11/91        |
| Illinois .....             | 837        | 10/91        | 479        | 12/91        |
| Indiana .....              | 400        | 09/91        | 296        | 11/91        |
| Iowa .....                 | 228        | 10/91        | 295        | 11/91        |
| Kansas .....               | 214        | 10/91        | 270        | 11/91        |
| Kentucky .....             | 288        | 10/91        | 190        | 11/91        |
| Louisiana .....            | 15         | 10/91        | 237        | 11/91        |
| Maine .....                | 98         | 10/91        | 186        | 11/91        |
| Maryland .....             | 334        | 11/91        | 173        | 11/91        |
| Massachusetts .....        | 355        | 11/91        | 281        | 11/91        |
| Michigan .....             | 681        | 11/91        | 737        | 11/91        |
| Minnesota .....            | 341        | 11/91        | 566        | 11/91        |
| Mississippi .....          | 179        | 10/91        | 160        | 11/91        |
| Missouri .....             | 374        | 10/91        | 336        | 11/91        |
| Montana .....              | 8          | 10/91        | 87         | 11/91        |
| Nebraska .....             | 138        | 10/91        | 185        | 11/91        |
| Nevada .....               | 76         | 10/91        | 55         | 11/91        |
| New Hampshire .....        | 73         | 11/91        | 124        | 11/91        |
| New Jersey .....           | 503        | 10/91        | 411        | 11/91        |
| New Mexico .....           | 118        | 11/91        | 94         | 11/91        |
| New York .....             | 1,245      | 11/91        | 716        | 11/91        |
| North Carolina .....       | 439        | 10/91        | 357        | 11/91        |
| North Dakota .....         | 67         | 11/91        | 146        | 11/91        |
| Ohio .....                 | 808        | 10/91        | 159        | 11/91        |
| Oklahoma .....             | 287        | 11/91        | 152        | 11/91        |
| Oregon .....               | 215        | 10/91        | 505        | 11/91        |
| Pennsylvania .....         | 796        | 11/91        | 189        | 11/91        |
| Rhode Island .....         | 66         | 11/91        | 142        | 11/91        |
| South Carolina .....       | 248        | 11/91        | 1,108      | 11/91        |
| South Dakota .....         | 66         | 10/91        | 44         | 11/91        |
| Tennessee .....            | 341        | 11/91        | 196        | 11/91        |
| Texas .....                | 1,190      | 10/91        | 494        | 11/91        |
| Utah .....                 | 124        | 11/91        | 82         | 11/91        |
| Vermont .....              | 49         | 10/91        | 103        | 11/91        |
| Virginia .....             | 417        | 10/91        | 248        | 11/91        |
| Washington .....           | 347        | 11/91        | 11         | 11/91        |
| West Virginia .....        | 136        | 11/91        | 210        | 11/91        |
| Wisconsin .....            | 375        | 11/91        | 560        | 11/91        |
| Wyoming .....              | 4          | 10/91        | 45         | 11/91        |
| Puerto Rico .....          | 0.18       | 03/92        | 56         | 05/92        |
| Virgin Islands .....       | 35         | 04/92        | (NA)       | (NA)         |

NA Not applicable.

# Summary Tape File (STF) 3A

Reel/cartridge

| Geographic area            | Size in mb | Release date | Geographic area                           | Size in mb | Release date |
|----------------------------|------------|--------------|---|------------|--------------|
| Alabama .....              | 527        | 05/92        | Nebraska .....                            | 450        | 05/92        |
| Alaska .....               | 136        | 04/92        | Nevada .....                              | 105        | 05/92        |
| Arizona .....              | 358        | 05/92        | New Hampshire.....                        | 122        | 04/92        |
| Arkansas .....             | 577        | 05/92        | New Jersey .....                          | 722        | 04/92        |
| California .....           | 2,242      | 05/92        | New Mexico .....                          | 201        | 04/92        |
| Colorado .....             | 412        | 05/92        | New York .....                            | 1,671      | 04/92        |
| Connecticut .....          | 292        | 03/92        | North Carolina .....                      | 939        | 05/92        |
| Delaware .....             | 68         | 04/92        | North Dakota .....                        | 389        | 05/92        |
| District of Columbia ..... | 49         | 04/92        | Ohio .....                                | 1,423      | 05/92        |
| Florida .....              | 1,074      | 04/92        | Oklahoma .....                            | 492        | 05/92        |
| Georgia .....              | 671        | 05/92        | Oregon .....                              | 338        | 05/92        |
| Hawaii .....               | 86         | 04/92        | Pennsylvania .....                        | 1,460      | 05/92        |
| Idaho .....                | 161        | 04/92        | Rhode Island .....                        | 87         | 04/92        |
| Illinois .....             | 1,645      | 05/92        | South Carolina.....                       | 410        | 05/92        |
| Indiana .....              | 790        | 05/92        | South Dakota.....                         | 311        | 05/92        |
| Iowa .....                 | 728        | 05/92        | Tennessee .....                           | 528        | 05/92        |
| Kansas .....               | 600        | 05/92        | Texas .....                               | 1,807      | 05/92        |
| Kentucky .....             | 468        | 05/92        | Utah .....                                | 202        | 05/92        |
| Louisiana .....            | 547        | 05/92        | Vermont .....                             | 87         | 03/92        |
| Maine .....                | 187        | 04/92        | Virginia .....                            | 616        | 04/92        |
| Maryland.....              | 478        | 04/92        | Washington .....                          | 544        | 05/92        |
| Massachusetts.....         | 539        | 04/92        | West Virginia .....                       | 299        | 05/92        |
| Michigan .....             | 1,437      | 05/92        | Wisconsin .....                           | 1,242      | 05/92        |
| Minnesota.....             | 900        | 05/92        | Wyoming.....                              | 98         | 05/92        |
| Mississippi .....          | 440        | 05/92        | Puerto Rico .....                         | (NA)       | (NA)         |
| Missouri .....             | 943        | 05/92        | Virgin Islands.....                       | (NA)       | (NA)         |
| Montana .....              | 145        | 03/92        | Pacific outlying areas <sup>1</sup> ..... | (NA)       | (NA)         |

NA Not applicable.

<sup>1</sup>Also on diskette.

Summary Tape File (STF 3A)—Continued

Compact disc—read-only memory (CD-ROM)

| Geographic areas                            | CD-ROM No. | Release date | Geographic areas                       | CD-ROM No. | Release date |
|---|------------|--------------|--|------------|--------------|
| Alabama .....                               | 1          | 01/93        | Minnesota .....                        |            |              |
| Alaska, Hawaii, Oregon .....                | 2          | 09/92        | Aitkin-Union .....                     | 30         | 12/92        |
| Arizona, Utah .....                         | 3          | 09/92        | McLeod-YellowMedic .....               | 31         | 12/92        |
| Arkansas .....                              | 4          | 11/92        | Mississippi .....                      | 32         | 01/93        |
| California, Los Angeles County .....        | 5          | 09/92        | Missouri .....                         |            |              |
| Los Angeles-Anaheim-Riverside, CA           |            |              | Adair-Livington .....                  | 33         | 02/93        |
| CMSA .....                                  | 6          | 08/92        | McDonald-Wright .....                  | 34         | 02/93        |
| San Francisco-Oakland-San Jose, CA          |            |              | Nebraska .....                         | 35         | 02/93        |
| CMSA counties of Alameda Contra Costa,      |            |              | New Jersey .....                       |            |              |
| Marin, Napa, San Francisco, San Mateo,      |            |              | Atlantic-Hunterdon .....               | 36         | 09/92        |
| Santa Clara, Santa Cruz, Solano,            |            |              | Mercer-Warren .....                    | 37         | 09/92        |
| Sanoma, Monterey. CA MSA Monterey ...       | 7          | 02/93        | New York .....                         |            |              |
| California-except Los Angeles-Anaheim-      |            |              | Albany-Oneida .....                    | 38         | 10/92        |
| Riverside CA CMSA, Salinas-Seaside-         |            |              | Onandaga-Yates .....                   | 39         | 10/92        |
| Monterey CA MSA, San Francisco-             |            |              | Bronx, Kings, NY, Queens, Richmond ... | 40         | 10/92        |
| Oakland-San Jose CA CMSA .....              | 8          | 02/93        | North Carolina .....                   |            |              |
| Colorado, New Mexico .....                  | 9          | 10/92        | Alamance-Jackson .....                 | 41         | 01/93        |
| Connecticut, Maine, Rhode Island,           |            |              | Johnston-Yancey .....                  | 42         | 01/93        |
| Vermont .....                               | 10         | 10/92        | North Dakota .....                     | 43         | 10/92        |
| Delaware, District of Columbia, Maryland .. | 11         | 09/92        | Ohio .....                             |            |              |
| Florida .....                               |            |              | Adams-Greene .....                     | 44         | 12/92        |
| Leon .....                                  | 12         | 09/92        | Guernsey-Morgan .....                  | 45         | 12/92        |
| Washington .....                            | 13         | 09/92        | Morrow-Wyandot .....                   | 46         | 12/92        |
| Georgia .....                               | 14         | 10/92        | Oklahoma .....                         | 47         | 01/93        |
| Idaho, Montana, Nevada, Wyoming .....       | 15         | 10/92        | Pennsylvania .....                     |            |              |
| Illinois .....                              |            |              | Adams-Dauphin .....                    | 48         | 01/93        |
| Adams-Cook .....                            | 16         | 01/93        | Delaware-Perry .....                   | 49         | 01/93        |
| Crawford-Macoupin .....                     | 17         | 12/92        | Philadelphia-York .....                | 50         | 01/93        |
| Madison-Woodford .....                      | 18         | 12/92        | South Carolina .....                   | 51         | 10/92        |
| Indiana .....                               |            |              | South Dakota .....                     | 52         | 10/92        |
| Adams-Lawrence .....                        | 19         | 12/92        | Tennessee .....                        | 53         | 12/92        |
| Madison-Whitley .....                       | 20         | 12/92        | Texas .....                            |            |              |
| Iowa .....                                  |            |              | Anderson-Dimit .....                   | 54         | 12/92        |
| Adair-Iowa .....                            | 21         | 01/93        | Donley-Karnes .....                    | 55         | 12/92        |
| Jackson-Wright .....                        | 22         | 01/93        | Kaufman-Reagon .....                   | 56A        | 12/92        |
| Kansas .....                                | 23         | 01/93        | Real-Zavala .....                      | 56B        | 12/92        |
| Kentucky .....                              | 24         | 10/92        | Virginia .....                         | 57         | 09/92        |
| Louisiana .....                             | 25         | 09/92        | Washington .....                       | 58         | 10/92        |
| Massachusetts, New Hampshire .....          | 26         | 10/92        | West Virginia .....                    | 59         | 10/92        |
| Michigan .....                              |            |              | Wisconsin .....                        |            |              |
| Alcona-GrandTraverse .....                  | 27         | 12/92        | Adams-Manitowoc .....                  | 60         | 01/93        |
| Gratiot-Midland .....                       | 28         | 12/92        | Marathon-Wood .....                    | 61         | 01/93        |
| Missaukee-Wexford .....                     | 29         | 12/92        |  |            |              |

**Summary Tape File (STF) 4A**

| Geographic area      | Size in mb | Release date | Geographic area | Size in mb | Release date |
|----------------------|------------|--------------|-----------------|------------|--------------|
| Alabama              | 1,408      | 04/93        | Montana         | 403        | 04/93        |
| Alaska               | 260        | 04/93        | Nebraska        | 665        | 04/93        |
| Arizona              | 1,155      | 04/93        | Nevada          | 396        | 04/93        |
| Arkansas             | 852        | 04/93        | New Hampshire   | 346        | 04/93        |
| California           | 8,830      | 05/93        | New Jersey      | 2,511      | 04/93        |
| Colorado             | 1,392      | 04/93        | New Mexico      | 621        | 04/93        |
| Connecticut          | 1,115      | 03/93        | New York        | 6,161      | 05/93        |
| Delaware             | 230        | 04/93        | North Carolina  | 2,046      | 04/93        |
| District of Columbia | 229        | 04/93        | North Dakota    | 311        | 05/93        |
| Florida              | 3,696      | 04/93        | Ohio            | 3,699      | 05/93        |
| Georgia              | 2,060      | 04/93        | Oklahoma        | 1,440      | 05/93        |
| Hawaii               | 373        | 04/93        | Oregon          | 1,070      | 04/93        |
| Idaho                | 418        | 04/93        | Pennsylvania    | 3,666      | 05/93        |
| Illinois             | 3,907      | 04/93        | Rhode Island    | 320        | 05/93        |
| Indiana              | 1,834      | 04/93        | South Carolina  | 1,143      | 04/93        |
| Iowa                 | 1,060      | 04/93        | South Dakota    | 313        | 04/93        |
| Kansas               | 1,066      | 04/93        | Tennessee       | 1,554      | 04/93        |
| Kentucky             | 1,274      | 04/93        | Texas           | 6,030      | 04/93        |
| Louisiana            | 1,473      | 04/93        | Utah            | 610        | 04/93        |
| Maine                | 453        | 04/93        | Vermont         | 235        | 03/93        |
| Maryland             | 1,615      | 03/93        | Virginia        | 2,027      | 04/93        |
| Massachusetts        | 1,644      | 04/93        | Washington      | 1,758      | 05/93        |
| Michigan             | 3,296      | 04/93        | West Virginia   | 604        | 04/93        |
| Minnesota            | 1,687      | 04/93        | Wisconsin       | 1,808      | 05/93        |
| Mississippi          | 817        | 04/93        | Wyoming         | 235        | 04/93        |
| Missouri             | 1,771      | 04/93        |                 |            |              |

**Summary Tape File (STF) 4B**

| Geographic area      | Size in mb | Release date | Geographic area | Size in mb | Release date |
|----------------------|------------|--------------|-----------------|------------|--------------|
| Alabama              | 439        | 12/93        | Montana         | 308        | 07/93        |
| Alaska               | 467        | 12/93        | Nebraska        | 428        | 07/93        |
| Arizona              | 397        | 12/93        | Nevada          | 281        | 06/93        |
| Arkansas             | 426        | 12/93        | New Hampshire   | 294        | 12/93        |
| California           | 2,194      | 12/93        | New Jersey      | 1,626      | 12/93        |
| Colorado             | 598        | 12/93        | New Mexico      | 621        | 06/93        |
| Connecticut          |            |              | New York        | 2,002      | 06/93        |
| Delaware             | 109        | 12/93        | North Carolina  | 719        | 12/93        |
| District of Columbia | 46         | 12/93        | North Dakota    | 223        | 06/93        |
| Florida              | 1,315      | 12/93        | Ohio            | 897        | 12/93        |
| Georgia              | 842        | 07/93        | Oklahoma        | 528        | 12/93        |
| Hawaii               | 285        | 07/93        | Oregon          | 536        | 12/93        |
| Idaho                | 376        | 07/93        | Pennsylvania    | 1,824      | 12/93        |
| Illinois             | 1,002      | 06/93        | Rhode Island    | 246        | 12/93        |
| Indiana              | 577        | 07/93        | South Carolina  | 406        | 12/93        |
| Iowa                 | 498        | 06/93        | South Dakota    | 303        | 07/93        |
| Kansas               | 520        | 06/93        | Tennessee       | 503        |              |
| Kentucky             | 537        | 07/93        | Texas           | 1,952      | 12/93        |
| Louisiana            | 615        | 12/93        | Utah            | 355        | 12/93        |
| Maine                | 329        | 12/93        | Vermont         | 219        | 12/93        |
| Maryland             | 531        | 07/93        | Virginia        | 741        | 12/93        |
| Massachusetts        | 879        | 12/93        | Washington      | 767        | 12/93        |
| Michigan             | 1,571      | 12/93        | West Virginia   | 318        | 07/93        |
| Minnesota            | 961        |              | Wisconsin       | 914        | 07/93        |
| Mississippi          | 403        | 12/93        | Wyoming         | 200        | 12/93        |
| Missouri             | 673        | 12/93        |                 |            |              |



## Subject Summary Tape Files (SSTF)

| Subject Summary Tape File (SSTF)  | Data files tapes<br>(size in mb) | Technical<br>documentation<br>(pages) | Release date | CD-ROM<br>release date |
|---|----------------------------------|---------------------------------------|--------------|------------------------|
| 1-The Foreign Born Population of the United States .....  | 123.1                            | 430                                   | 07/93        | 09/94                  |
| 2-Ancestry of the Population in the United States .....   | 132.5                            | 384                                   | 07/93        | 10/94                  |
| 3-Persons of Hispanic Origin in the United States .....   | 51.5                             | 378                                   | 07/93        | 10/94                  |
| 4-Characteristics of Adults With Work Disabilities,<br>Mobility Limitations, or Self-Care Limitations ..... | 361.1                            | 364                                   | 01/95        | 04/95                  |
| 5-The Asian and Pacific Islander Population in the United<br>States .....                                   | 186.5                            | 378                                   | 07/93        | 10/94                  |
| 6-Education in the United States .....  | 24.8                             | 298                                   | 03/94        | Due 1995               |
| 7-Metropolitan Housing Characteristics .....  | 1,075.0                          | 576                                   | 03/94        | 04-06/95               |
| 8-Housing of the Elderly .....  | 143.9                            |                                       | Due 1995     | Due 1995               |
| 9-Housing Characteristics of New Units .....  | 87.7                             | 518                                   | 03/94        | Due 1995               |
| 10-Mobile Homes .....   | 84.1                             | 498                                   | 03/94        | Due 1995               |
| 11-Language Use in the United States .....  |                                  |                                       | Cancelled    |                        |
| 12-Employment Status, Work Experience, and Veteran Status ..  | 42.0                             | 344                                   | 05/94        | Due 1995               |
| 13-Characteristics of American Indians by Tribe and Language .  | 22.0                             |                                       | Due 1995     | 07/95                  |
| 14-Occupation and Industry .....  |                                  |                                       | Due 1995     | 05/95                  |
| 15-Geographic Mobility for Metropolitan Areas .....   |                                  |                                       | Due 1995     | Due 1995               |
| 16-Fertility .....  | 32.0                             | 422                                   | 05/94        | 07/95                  |
| 17-Poverty Areas in the United States .....   |                                  |                                       | Due 1995     | 02/95                  |
| 18-Condominium Housing .....  | 87.8                             | 476                                   | 03/94        | Due 1995               |
| 19-Older Population of the United States .....  |                                  |                                       | Due 1995     | Due 1995               |
| 20-Journey to Work in the United States .....   | 76.7                             | 368                                   | 05/94        | Due 1995               |
| 21-Characteristics of the Black Population .....  | 387.5                            |                                       | 02/95        | Due 1995               |
| 22-Earnings by Occupation and Education .....   | 990.0                            | 320                                   | 02/95        | 01/95                  |

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# CHAPTER 11.

## Census Research, Evaluation, and Experimental (REX) Program

### INTRODUCTION

The 1990 Census Research, Evaluation, and Experimental (REX) Program had its beginnings early in the 20th century. The Bureau director's annual reports in the 1920's, for example, describe efforts to estimate intercensal population for incorporated places down to the level of 8,000 or more inhabitants (as opposed to carrying out special censuses; those began in 1915). The development of probability sampling prior to the 1940 Decennial Census of Population, and its first major use then to produce estimates for population characteristics (as well as quality control in census processing), involved research, evaluation, and experimental functions. Within the 1940 census itself (and a 1939 test in two Indiana counties), the Bureau used an "infant card" to evaluate the completeness of both infant enumeration in the census and birth registration. By comparing State records with the census, field followup on unmatched cases would determine the causes either of nonregistration or underenumeration.<sup>1</sup> The 1940 census also marked the first official focus on one aspect of coverage improvement research—enumerating mobile persons by contacting them at a specific time. T (transient)-Night was April 8.<sup>2</sup>

After the 1940 census, there was a post-censal program in which the Census Bureau evaluated some of the questions, such as labor force, income, and residence 5 years ago, but attempts to estimate underenumeration based on preliminary sample data were considered too "approximate" to report. However, outside researchers did some limited analysis of coverage among specified age groups.<sup>3</sup>

The 1941 *Annual Report of the Secretary of Commerce* outlined proposals for sample censuses (e.g., one of Washington, DC) and research in sampling techniques during the ensuing years, but the United States' active entry into World War II put these plans on "hold." In 1946, the Bureau obtained funds for a national sample census in

1947, and even tested it in Wilmington, NC, in 1946, but funding for the census itself was not forthcoming in 1947, and the developmental effort was channeled toward the 1950 decennial census instead.<sup>4</sup>

With the 1950 census, the Bureau had in place a REX program that both looked back at the preceding census and forward toward the next one. The main purpose was to look at accuracy, i.e., identify sources of error and measure the errors so that the staff could make users aware of data limitations. In this connection, and also with regard to content and procedures, the staff planned and carried out innovative projects dealing with census and survey methodology. That would be done through record checks, reinterviews, field tests, and consultation outside the agency. Another major purpose was to specifically evaluate coverage (both over- and under-counting) in the census through post-enumeration surveys (PES's) and demographic analysis (DA). While the 1950 PES, which reinterviewed 22,000 households, estimated the net census undercount at 2.1 million persons, demographic analysis suggested a figure closer to 5 or 5.5 million. Based on that experience, later PES's increased considerably in sample size and began using methods based on the ideas of "dual-system" estimation (i.e., either in or not in the census, as well as either in or not in the PES).<sup>5</sup>

Content evaluation for 1950 applied two basic methods, *reenumeration and record checks*, which the staff continued to use and refine in later years. They subjected the 1950 procedures to studies of data-collection methodology and enumerator variance, experimented with self-enumeration, and tested a household questionnaire as an alternative to the 1950 "line" schedule that listed 30 persons and 12 dwelling units on a page. The 1950 evaluation program led to increased use of self-enumeration and sampling in the 1960 census, as well as revised wording in some of the questions.

For 1960, a match between the census and the Current Population Survey (CPS) produced indexes on inconsistency for various labor-force and income characteristics, and a reinterview sample of 5,000 households produced an estimate of simple response variance and response bias. The staff studied the effects of dependent vs. independent

<sup>1</sup>Cf., for examples, U.S. Bureau of the Census, *Annual Report of the Director of the Census to the Secretary of Commerce [year]*, 1923, p. 22; 1924, p. 9; 1934, p.23; and the Secretary's own report for 1940, p. 6 (see n. 4 below for citation). See also, U.S. Department of Commerce, *Revolution in United States Government Statistics, 1926-1976* (Washington, DC, 1978), p. 43 ff.; p. 61 describes W. Edwards Deming's (and others') work at the Census Bureau from 1939 on in controlling processing errors by statistical methods.

<sup>2</sup>For details, see, Robert M. Jenkins, *Procedural History of the 1940 Census of Population and Housing* (Madison, WI: University of Wisconsin, 1985), p. 22.

<sup>3</sup>*Ibid.*, pp. 62-67; National Research Council, Panel on Decennial Census Methodology, *The Bicentennial Census New Directions for Methodology in 1990* (Washington, DC: National Academy Press, 1985), p. 125.

<sup>4</sup>U.S. Department of Commerce, *Annual Report of the Secretary... 1941*, p. 41; *Annual Report of the Director... 1946*, p. 9, and 1948, p. 9.

<sup>5</sup>See, Edwin D. Goldfield, "Innovations in the Decennial Census of Population and Housing: 1940-1990" (a commissioned paper for The Year 2000 Census Panel Studies), Committee on National Statistics, National Research Council, August 1992, p. 5 ff.; Howard Hogan, "The 1990 Post-Enumeration Survey: An Overview," *The American Statistician*, Vol. 46, No. 4 (Nov. 1992), p. 261.

reconciliation, and carried out two major record checks to evaluate respondent reports on income and on occupation and industry. There were several analyses of sources of error in census data caused by enumerator and crew leader biases, response variance, coder variance, and violation of processing rules. Prior to and during the census, there were coverage-improvement studies in selected areas, where postal carriers reported any missed or duplicated households on their routes. Most study results led to further expansion of self-enumeration and to improvement in the processing procedures for the 1970 census. The 1960 PES had an area sample of 2,500 segments containing 25,000 housing units and an independent list sample of 15,000 more units. Most 1960 REX results led to further expansion of self-enumeration and to improvement in processing procedures for 1970.<sup>6</sup>

There were three major reenumeration studies of content errors in the 1970 census. One, covering about 11,000 housing units, emphasized items included in the census for the first time (some of which were subjected to a three-way match to administrative records as well), and led to estimates of simple response variance for selected characteristics. In a second study, the field staff reinterviewed a sample of 40,000 households to estimate response bias in the census question on disability. The third study was another CPS-census match to determine response differences between the March 1970 CPS and the census. Content error was evaluated through record checks and reporting error through examination of the responses to such items as employment 5 years ago, value of home, and place of work. Procedural evaluations and tests in the 1970 census analyzed enumerator coding, sample control, distortions in sample size, special coverage-improvement procedures, field quality control, and geographic coding. Finally, some "conventional" district offices (i.e., those using the traditional door-to-door method of enumeration) tried mail procedures to see whether it was feasible and appropriate to expand the mail census further into those areas in 1980. These evaluations identified problems with content, questionnaire design, data collection, and processing procedures that the staff addressed when planning the 1980 census. The mail-extension test and the studies of correlated response error encouraged expanding the mail census from 65 percent of the population in 1970 to 95 percent in 1980.<sup>7</sup>

The 1980 REX program consisted of over 40 separate projects; their objectives were as follows:

- *Coverage evaluation and coverage measurement procedures*—By far the largest group of projects, this category included the major coverage measurement studies. The

<sup>6</sup>For further details on the 1960 REX program, see, U.S. Bureau of the Census, *1960 Censuses of Population and Housing: Procedural History* (Washington, DC, 1966), chapter 10; for reports, see *id.*; *Evaluation and Research Program...1960*, series ER60 (Washington, DC, 1963-1972).

<sup>7</sup>For further discussion of the 1970 REX program, see U.S. Bureau of the Census, *1970 Census of Population and Housing, Procedural History*, series PHC(R)-1 (Washington, DC, 1976), chapter 14, and for results, *id.*, *Evaluation Reports*, series PHC(E), 1973-1978.

staff estimated population coverage through the post-enumeration program (PEP), administrative-record matching, and demographic analysis. Three studies dealt with housing coverage, including estimates of overenumeration. The forward- and retrospective-trace studies and the Internal Revenue Service (IRS)/census match had to do with alternative population-coverage measurement procedures. The Bureau also conducted an evaluation of S-night coverage.

- *Experimental program*—The research efforts in this category included tests of alternative data-collection methods and ways to recruit, train, and maintain the temporary work force.
- *Coverage-improvement evaluations*—The studies in this category evaluated the cost, results, and field procedures for various components of the 1980 census coverage-improvement program.
- *Processing and quality-control (QC) evaluations*—This category included a number of evaluations to study aspects of the data capture and processing system. The staff was particularly interested in the effectiveness of QC operations on the census program.
- *Content evaluations*—These investigated the validity of the responses to various census questions, such as utility costs and education.
- *"Other" studies*—Two studies in this category, one of the components of variance and the other of total error, were designed to estimate nonsampling errors in the census data. The other evaluations addressed the effect of the publicity program and respondents' behavior regarding the census questionnaire.

A number of the 1980 REX studies were designed purposely to be carried out during, rather than after, the census. This would allow researchers to examine procedures and data at various stages of completeness or to conduct experiments side by side with standard census activities and use the latter as controls. These optimal conditions could not always be met, so that a number of the 1980 REX projects had procedural and/or timing problems, or could not be finished. In other cases, both during and after the census, the data were insufficient or inconclusive. Some of the results were tentative in nature and therefore had to be used with caution. The PEP used three separate surveys as its principal sources: (1) The April 1980 CPS sample of approximately 84,000 noninstitutional households, (2) the August 1980 CPS sample, of the same size, and (3) approximately 110,000 households selected from the census itself. (1) and (2) were called the "P" (population) samples, and (3) was called the "E" (estimation) sample. The staff used dual-system (or capture-recapture) estimation as a way to compensate for the P samples' imperfect coverage.<sup>8</sup>

<sup>8</sup>For details of the 1980 REX program, see, *id.*, *1980 Census of Population and Housing, History*, series PHC80-R-2E (Washington, DC, 1989), chapter 9. For published results, see *id.*, *Population and Housing Evaluation Reports*, series PHC80-E (Washington, DC, 1985-1988).

The 1990 REX program, described below, resembled the 1980 effort both in content and scope: it was an "umbrella" for evaluations of coverage, content, and procedures in the decennial census. Under the general coordination of the Decennial Planning Division (DPLD; name changed to Decennial Management Division (DMD) in June 1992), most of the 1990 projects were carried out in the Statistical Support Division (STSD; name changed to Decennial Statistical Studies Division (DSSD) in April 1992), the Statistical Research Division (SRD), the Center for Survey Methods Research (CSMR), and the Field Division (FLD). To a lesser extent, the following divisions also had active projects: Decennial Operations (DOD), DPLD, Data User Services (DUSD), Geography (GEO), Housing and Household Economic Surveys (HHES), and Technical Support (TSD).

The 1990 REX Steering Committee provided overall direction in the REX effort assisted by a working-level task force of decennial division representatives. The basic REX program was comprehensive and well-balanced, and addressed aspects central to the census process, such as content, coverage, procedures and processing. The REX also had flexibility to consider and integrate new proposals that were to arise throughout the census process. Each study was designed to produce results at the national level as well as appropriate subnational levels, and also by demographic groups, type of enumeration technique, and the like. The objectives of the three major components of the REX program were as follows:

- The **content** portion of the REX program would assure that the Bureau obtain information on (1) the quality of data from the 1990 census, (2) the effect of sampling, nonsampling, coverage, and geographic errors on data use, (3) determining more efficient and accurate ways of collecting census data, and (4) monitoring, documentation, and correction of errors identified in data collection and processing.
- **Coverage** studies for the 1990 census were to provide accurate and informative measures of population and housing coverage by population group and other correlates of undercoverage, such as demographic and housing characteristics, type of enumeration, geography, etc. The major components of these studies were the PES and evaluations of the quality of the PES operations, demographic analysis and evaluations of error components in DA, coverage enhancement techniques, and studies to evaluate and test ways to enumerate special populations.
- The studies on **procedures and processing** emphasized new or expanded techniques for the 1990 census. These studies included—operational efficiency between and within processing offices, TIGER and geocoding, and promotion and outreach.

Beginning in the mid-1980's, DPLD collected proposals for REX projects and had a preliminary program of 17

studies.<sup>9</sup> These are summarized below and identified by the acronyms (above) of the divisions to which they were assigned. The REX task force reviewed all submissions, giving priority to approved proposals in terms of both staff and fiscal resources required for program development. The task force forwarded proposals that met these requirements to the REX Steering Committee for final review and approval. Some REX studies were proposed and approved as late as August 1990.

## Data Content and Quality

**Alternative Questionnaires Experiment** (CSMR) called for mailing, to 35,000 households nationwide, five experimental questionnaires with modified question wording, sequence, and rosters. One panel left out all names/identifiers. The control panel (an additional 6,000 households) had no "motivational insert," so it would be used to measure such an insert's impact on mail-return rates. The experiment examined various factors, such as patterns of nonresponse rates, coverage and item nonresponse with respect to the alternative questionnaires.

**Master Trace Study** (STSD) was to trace a nationwide sample of 31,000 questionnaires through processing. Copies were made before and after all major operations for which the processing offices did not maintain automated files. The automated files, plus the copies, would yield data on changes introduced into the questionnaire records during processing, and allow measurement of the processing procedures on the quality of the sample. All Content Reinterview cases (see below) were part of this study sample.

**Content Reinterview** (STSD) involved reinterviews (mostly by telephone) for 12,800 housing units to estimate response bias and variance for selected questions. Response variance was broken down for various subpopulations.

**Census/Residential Finance Survey Match** (HHES) was to measure nonsampling error in census estimates through a form-by-form match between households in the Residential Finance Survey and the census.

**Macro Level Consistency Check** (POP) analyzed the differences, by demographic characteristics, between census counts and corresponding counts from external sources.

**Evaluation of Coding** (STSD) was an "expert recoding" operation to determine the validity of error definitions used in quality-assurance (QA) coding of selected write-in responses.

**Integrated Evaluation of Error** (STSD) described the magnitude and relationship of error introduced by various operations, including sampling, response, coding, editing, and imputation. It looked for differences, by demographic characteristics, in response-error rates, and was to develop a total-error model for 1990 census data.

<sup>9</sup>U.S. Bureau of the Census, *Minutes and Report of Committee Recommendations*, October 13-14, 1988, pp. 18-20; *ibid.*, *Minutes and Report of Committee Recommendations*, October 19-20, 1989, pp. 48-51.

## Coverage

**Post-Enumeration Survey (SRD)** was an independent enumeration of the population (as of Census Day) based on an independent listing in a sample of blocks. The PES matched persons in 172,000 housing units and in non-institutional and nonmilitary group quarters to the census to estimate coverage at various geographic levels and to calculate net coverage errors for Blacks, Hispanics, American Indians, and Asians/Pacific Islanders. Various reports addressed the levels of undercount.

**Evaluations of Census Coverage Estimates (STSD)** were a set of studies that evaluated the quality of the PES estimates of coverage error, examining the effects of such factors as missing data, interviewer fabrications, and clerical matching errors.

**Demographic Analysis (POP)** was an independent estimate of net coverage in the census by age, race, and sex; based on analysis of birth, death, and immigration records; and records of previous censuses and surveys. It provided undercount measures for comparison with the PES.

**Housing Unit Coverage Study (SRD)** was to produce estimates of housing-unit coverage error in the census by matching and field followup of a sample of PES addresses. Estimates of housing unit coverage were made by occupancy status, tenure, region, place type, and size of structure.

**Ethnographic Evaluation of Behavioral Causes of Undercount (CSMR)** involved having researchers study census enumeration in a limited number of blocks and hypothesize the causes of error in hard-to-enumerate populations. The various reports would focus on undercounting undocumented migrants, Hispanics, Blacks, American Indians, and recently arrived Asian and other refugees.

**Coverage Improvement Techniques Study (STSD)** was a set of evaluations designed to assess coverage yields, costs, and errors associated with all of the major coverage-improvement operations in 1990. The records of people and housing units added by many of these operations were cross-tabulated with their demographic characteristics to see what effect the various techniques had on improving the coverage of specific population groups.

**Coverage Sampling Research (STSD)** was a set of experimental procedures (such as telephone reinterviews about coverage in mail-return households) tested in 10 district offices that included hard-to-enumerate areas.

## Procedures and Operations

**Evaluation of Outreach (CSMR)** was a survey to evaluate the impact of several 1990 census promotion activities (see ch. 5)—the Census Awareness and Products Program (CAPP) and messages and materials, especially those targeted at minority populations—by examining knowledge and attitudes about the census and the characteristics of respondents and nonrespondents. The techniques included personal-visit interviews in sample households either before or after Census Day, and interviews

and focus-group discussions with representatives of community organizations and small populations, such as American Indians/Alaska Natives and Asians/Pacific Islanders.

## COVERAGE IMPROVEMENT PROJECTS

### Vendor File

The Census Bureau purchased the initial inventory of addresses (i.e., 69.3 million addresses) from commercial vendors for densely populated urban areas as well as for areas surrounding central cities (tape address register (TAR) areas)<sup>10</sup> and assigned each address to specific census geography. This assignment (i.e., geocoding) included computer, clerical, and field coding, as necessary. The geocoding of the vendor addresses and the advanced post office check I (see below) operation occurred concurrently. The data for evaluation were supplied prior to Census Day 1990 with the data that were requested for the APOC I evaluation. Special procedures were used to obtain and geocode vendor addresses for Hawaii.

After the geocoding, the census address file included approximately 51.6 million addresses. Computer and clerical geocoding resulted in a national geocoding rate of 98.9 percent. The State-level geocoding rates ranged from 97.0 to 99.8 percent with a median value of 99.0 percent. The final count of TAR addresses after geocoding and other processing activities was approximately 56.9 million. The vendor lists were responsible for the majority of the addresses (90.7 percent) in TAR areas. (See 1990 Census of Population and Housing, *Evaluation and Research Reports: Programs to Improve Coverage in the 1990 Census*, 1990 CPH-E-3.)

### 1988 Prelist (Mailout/Mailback Prelist)

The Census Bureau conducted the prelist in mailout/mailback areas in smaller cities and suburban and some rural areas during the period of February through August 1988. The objectives of the 1988 prelist were to (1) obtain a complete and accurate mailing address for each housing unit and special place within the prelist areas, (2) record the physical location description and householder name for living quarters that did not have house number and street name mailing addresses, (3) annotate census maps to show the location of all living quarters, and (4) assign each living quarters to its correct 1990 census geography.

The evaluation results of the prelist were obtained by examining a sample of prelist address registers and by reviewing numerous observation reports, debriefing questionnaires, and the prelist data file summaries. There were a total of 2,271,462 blocks canvassed during the 1988 prelist operation. Of these blocks, 75 percent contained living quarters, and 25 percent contained no living quarters

<sup>10</sup>For the 1990 census, TAR was the area covered by a computerized list of residential addresses created from a commercial mailing list, a post office check of that list, and a field canvass of residential addresses by census enumerators.



(LQ's). Enumerators listed a total of 27,895,927 LQ's that were classified as follows: 76 percent were city delivery addresses, 13 percent were rural route and/or box number addresses, 5 percent were post office box addresses, less than 1 percent had "other" address types, and 5.5 percent had some combination of address characteristics that made them nonmailable. A total of 83,890 special places (0.3 percent of the total listings) were identified during the prelist operation. (1990 CPH-E-3)

### 1989 Prelist (Update/Leave Prelist)

The 1989 prelist operation took place in areas where the Census Bureau believed there would be problems developing a comprehensive mailing list and the United States Postal Service (USPS) would have difficulty delivering the census questionnaires. The prelist generated address lists for update/leave areas (mostly in the rural South and Midwest). Analysis and review of prelist address registers, observation reports, and prelist data summaries were used to obtain the evaluation results.

A total of 1,364,835 blocks were canvassed during the prelist operation. Living quarters were found in 68 percent of the blocks, while 32 percent contained no living quarters. Enumerators listed and categorized 10,157,368 living quarters with the following address characteristics: approximately 31 percent were city delivery addresses, approximately 32 percent were rural route and/or box number addresses, approximately 9 percent had post office box addresses, and approximately 28 percent had "other" address types.

About 10 percent of the prelist units were classified as vacant. Approximately 94 percent of the prelisted units came from just 4 (of 13) of the regional census centers — Kansas City, Charlotte, Atlanta, and Dallas. (1990 CPH-E-3)

### Advance Post Office Check (APOC I)

The APOC I was a coverage-improvement operation in which the U.S. Postal Service verified the accuracy and completeness of address lists the Bureau had purchased in 1988.<sup>11</sup> These lists, which covered postal ZIP Codes in so-called TAR areas, were printed out on cards. During APOC I, in summer and early fall 1988, letter carriers sorted ("cased") the cards according to their delivery routes, made corrections, and identified duplicate or undeliverable addresses. If an address was missing, the carrier was to fill out a card (called a "blue card") with the information needed to add it to the census address list.

The USPS classified approximately 95.9 percent of the 55 million addresses on the vendors' lists as "deliverable as addressed," 2.0 percent as "deliverable with correction," and 2.1 percent as "undeliverable." Of the "deliverable with correction" addresses, about 53.2 percent had a

corrected street name with no correction to house number, about 32.7 percent had a corrected unit designation with no change to the house number or the street name, and the remaining 14.1 percent had a corrected ZIP Code only. There were 1,486,645 housing units added during APOC I which represented about 2.6 percent of all TAR housing units. (1990 CPH-E-3)

**APOC I suppression study**—A two-stage systematic sample design was used to select a sample of addresses from the original address list for TAR areas. All post office box addresses were excluded from the sample selection. The first stage sampling rate was .0079; the second stage sampling rate was .0052, and the overall sampling rate was .000041. Following APOC I, the suppressed addresses were clerically matched to the address add cards for the sample ZIP Codes to determine which of the suppressed addresses were added during APOC I. The next step was to determine which of the suppressed addresses that did not match to an address add card were legitimate residential addresses and therefore should have been added during APOC I. The estimated overall add rate of the APOC I was 62.6 percent (SE=2.7 percent).<sup>12</sup> In other words, the USPS added about 62.6 percent of the missing addresses (66.0 percent of the missing single unit addresses and 54.6 percent of the missing addresses in multiunit structures). (1990 CPH-E-3)

### APOC II and APOC III

The Bureau conducted APOC II and III operations in prelist mailout/mailback areas. The purpose was to have the USPS review the addresses listed in the prelist mailout/mailback areas in preparation for the 1990 census. Special places such as hospitals and marinas were excluded from APOC II and III; however, blue cards completed for special places were keyed into the special place file. The USPS was instructed to improve the deliverability of the addresses obtained during prelist.

Since the blue (add) cards prepared by the USPS were not counted prior to delivery to the district offices, a sample was taken to obtain estimated totals and estimated proportions of blue cards for the APOC reconciliation status categories. A multiple-start systematic sample of 30 district offices was taken from 151 district offices containing APOC II workloads. For the APOC III workloads, a multiple-start systematic sample of 30 district offices was taken from 181 district offices.

Of the prelist addresses sent to APOC II and III, 82.9 percent were deliverable with or without corrections. The APOC carriers corrected 8.4 percent of the addresses sent to APOC (including unacceptable corrections), classified 10.1 percent as undeliverable and considered 2.7 percent as duplicates. Overall, the APOC operation made a valuable contribution to updating the list of addresses obtained

<sup>11</sup>For more details on APOC coverage improvement, see U.S. Bureau of the Census, 1990 Census of Population and Housing, *Evaluation and Research Reports: Programs to Improve Coverage in the 1990 Census*, 1990 CPH-E-3 (Washington, DC: Government Printing Office, 1993).

<sup>12</sup>SE stands for standard error.

during the mailout/mailback prelist. There were an estimated 1,457,351 blue cards completed during APOC II (SE=2667) and an estimated 1,412,169 blue cards completed during APOC III (SE=4630). Of these, an estimated 21 percent (SE=2.64 percent) were classified as adds during APOC reconciliation. (1990 CPH-E-3)

### **APOC Reconciliation**

The APOC field reconciliation operation was an integral part of the coverage improvement program. APOC reconciliation was conducted only in the prelist mailout/mailback areas following APOC II and III to verify that each blue card was for a residential address not already accounted for in the census files. In addition, the APOC reconciliation enumerators attempted to get a better mailing address for undeliverables, verify the existence of each address classified as a duplicate by the USPS, and resolve clusters. Similar to APOC, APOC reconciliation occurred in two phases: (1) APOC reconciliation II in June 1989 and (2) APOC reconciliation III in August 1989.

Since exact counts of blue cards prepared during the APOC were not available, a sample was taken to obtain estimated totals and estimated proportions of blue cards for the APOC reconciliation status categories. During APOC reconciliation, enumerators obtained a corrected address for about 55 percent of the undeliverables, deleted about 6 percent of the undeliverables, and added nearly 1.2 million addresses. (1990 CPH-E-3)

### **Precanvass**

Following the APOC I operation, enumerators canvassed all addresses in TAR areas to update the address lists. Almost 6 million addresses were added at 3.3 million basic street addresses as a result of the precavass operation. This represented an 11.5 percent increase in TAR addresses. About 4.3 percent of the before precavass addresses were flagged as deletes and about 2.6 percent of the basic street addresses were identified as geographic transfers. (1990 CPH-E-3)

### **Precanvass Suppression Study**

During the 1990 precavass (see ch. 6), a sample of housing units (usually four) was suppressed from the address registers to see how effectively enumerators added (at the end of each register) addresses that were not listed. After precavass, STSD selected a systematic random sample of 840 precavass register assignments from the universe of 34,840. Some of the findings were as follows:

- The weighted estimate of the overall precavass "miss rate" for both single-unit and multiunit basic street addresses was approximately 30.0 percent (SE=1.6 percent).
- The miss rate for housing units suppressed from multi-unit addresses was significantly higher than for single-unit addresses—45.2 percent (SE=4.1 percent), compared with 24.3 percent (SE=1.5 percent).

- Despite the high estimated miss rate, the majority of enumerators apparently did fairly well. Of the address registers sampled, 63.6 percent contained at most one miss. (1990 CPH-E-3)

### **Precanvass Reconciliation and Yellow Card Coding**

The purpose of the yellow card coding operation was to assign the correct geocodes to addresses that were either ungeocoded after prior census operations or had conflicting geocodes after precavass. The findings were as follows:

- The yellow-card workload was 2,052,333 addresses. A total of 1,206,376 addresses were identified as either adds (59.2 percent) or reconciled addresses (40.8 percent).
- There were 57,612,468 TAR addresses on the address control file (ACF) after the precavass. Therefore, the addresses added to the ACF from yellow-card coding (491,810) represented a 0.9-percent increase of TAR addresses on the ACF. (1990 CPH-E-3)

### **Local Review**

The local review program was a Census Bureau coverage-improvement procedure that asked local governments to provide voluntary assistance in the search for missed housing units. The local review process was divided into precensus and post-census local review. Precensus local review involved only governments in mailout/mailback enumeration areas, while the post-census local review gave all local governments the opportunity to take part in the review operation.

**Precensus local review**—There were a total of 39,198 functioning government units (GU's) at the time of the precensus local review; however, the operation was limited to the above-mentioned mailout/mailback areas because address listings were available at the time only for these areas. Of the 39,198 government units, 21,048 (53.7 percent) were mailout/mailback areas eligible to participate in the process. Of the 21,048 eligible government units, 3,440 government units (16.3 percent) took part in the program and 2,883 (83.8 percent) of the participating government units challenged the Bureau's housing count figures. Of the 4 million blocks in the mailout/mailback areas, government officials challenged approximately 121,000 blocks. Of these blocks, 52.2 percent were recavassed by census district office personnel. The remaining blocks were not recavassed because they did not meet the recavassing guidelines for precensus local review.

The overall coverage improvement resulting from the precensus local review was 367,313 housing units. That was a 0.4-percent increase over the prior housing unit count. Overall, 69.3 percent of these added housing units had an occupied status, 14.6 percent were vacant, and the remaining 16.1 percent were eventually deleted by later census operations.

**Post-census local review**—The post-census local review was undertaken in the summer and fall of 1990 after the recanvass operation and was open to all functioning government units. Of the 39,198 government units nationwide, 9,847 (25.1 percent) took part. Of those participating, 6,602 (67.0 percent) government units contested the Bureau housing unit counts. Of the approximately 6.5 million blocks, 270,650 blocks were challenged (4.2 percent of the blocks nationwide). Census enumerators then recanvassed 168,255 blocks (about 62 percent), having omitted the ones that had not met the Bureau's criteria.

The post-census local review operation added 80,929 housing units. This was about a 0.1 percent increase over the previous census housing-unit count. Overall, 58.7 percent of the added housing units were classified as occupied, 29.6 percent were vacant, and 11.7 percent were eventually deleted by later census operations.

The Bureau found that the local review programs successfully added valid housing units to the Bureau count, with a total of 231,291 blocks recanvassed through this procedure. The precensus local review was especially effective, contributing 367,313 valid added housing units. The post-census local review added 80,929 more valid units. The success of the post-census review appeared to be tempered somewhat by the completion of the Bureau's recanvassing operation just prior to the post-census local review. (1990 CPH-E-3)

### Casing Check

In late February and early March 1990, the USPS again checked census addresses by casing them according to carrier route. This was called the census address check. In the census address check, the USPS cased approximately 83.9 million cards and produced around 4.0 million blue cards. After rejecting addresses that could not be geocoded by computer and addresses identified during field followup as nonexistent, businesses, etc., the census address check appeared to have generated approximately 930,000 adds of missing addresses or an increase of about 1.0 percent. (1990 CPH-E-3)

### Rural Update/Leave

The Bureau's 1989 prelist campaign included mainly addresses that were later enumerated using update/leave methodology. In update/leave areas, enumerators delivered the census questionnaires to households and respondents were instructed to complete the forms and return them by mail.

Enumerators were supplied with a prelabeled census questionnaire for each housing unit listed in the address register. The enumerators canvassed the census blocks, verified address information, and delivered the questionnaire. If an enumerator came across a housing unit that was not on the address register, he or she addressed and delivered a blank census questionnaire. Corrections and updates to the address register and the prelist maps (deletes, additions, or transfers) were made when necessary.

Results from the update/leave enumeration were—

- The update/leave enumerators added 399,404 valid addresses to the original 10,020,120 prelist addresses, representing an increase of 4.0 percent.
- Adds deleted following update/leave totaled 39,856 (9.1 percent of the total adds).

A comparison of update/leave prelist areas to mailout/mailback prelist areas indicated—

- Around 69.1 percent of the update/leave addresses were rural, while only 24.2 percent of the mailout/mailback prelist addresses were rural.
- Vacancy rates for update/leave and mailout/mailback prelist areas were 13.5 and 9.4 percent, respectively.
- In update/leave areas, enumerators classified approximately 3.9 percent of their questionnaires as undeliverable, whereas 8.9 percent of the questionnaires in mailout/mailback prelist areas were deemed undeliverable.
- The prelisted update/leave addresses were incomplete 21.2 percent of the time, and the prelisted mailout/mailback addresses were incomplete 3.0 percent.
- Final delete rates for update/leave and mailout/mailback prelist areas were identical 4.9 percent. (1990 CPH-E-3)

### Urban Update/Leave

The urban update/leave operation was implemented almost exclusively within preidentified census blocks made up of mostly public housing developments containing 500 or more units.

Enumerators were given precanvass maps containing blocks that were part of the operation. The enumerators verified the address at each housing unit and, based upon this information, made corrections to the address register and annotated questionnaires that had been earmarked for deleted units. Respondents were given a prelabeled questionnaire to complete and return to the processing office. For those addresses not on the register and therefore without a prelabeled form, the enumerator addressed a blank label questionnaire.

Urban update/leave was conducted in 346 census blocks in Chicago, Detroit, Los Angeles, Baltimore, Cleveland, and Philadelphia. All of the chosen blocks were part of TAR areas. To measure the effectiveness of the urban update/leave process a control group was chosen from blocks of TAR mailout/mailback areas in New York and the District of Columbia that were originally included in the urban update/leave operation but were later excluded. Mail return rates were compared to ascertain the success of the operation.<sup>13</sup>

<sup>13</sup>Mail return rates are defined as the ratio of the number of households that returned a questionnaire by mail to the number of occupied units that should have received a questionnaire by mail or through delivery by an enumerator.

The urban update/leave was intended for public housing developments containing at least 500 units; however, only 77.2 percent of the units in the urban update/leave area were in multiunit structures while 20.7 percent were single units. Therefore, conclusions drawn concerning the effectiveness of the urban update/enumeration in public housing developments were tempered.

**Types of housing units**—There were 20.7 percent single units in the urban update/leave areas compared to 2.1 percent in the control group.

**Vacancy rates by city**—The proportion of vacant units in urban update/leave areas was substantially higher than the percentage of vacant units in the control group, 27.1 percent vs. 2.4 percent. Also there was great variation between the vacancy rates of the cities taking part in the urban update/leave enumeration.

|              |              |
|--------------|--------------|
| Los Angeles  | 3.3 percent  |
| Chicago      | 28.2 percent |
| Baltimore    | 9.9 percent  |
| Detroit      | 53.7 percent |
| Cleveland    | 45.7 percent |
| Philadelphia | 24.3 percent |

**Race distribution**—The majority of the persons in the urban update/leave blocks were Black (88.4 percent), while 6.9 percent were classified as White and 4.7 percent were classified as non-Black minority. The urban update/leave control group contained a higher proportion of White and non-Black minority persons (16.6 percent and 23.8 percent, respectively). Additionally, about 5.6 percent of those people in the urban update/leave area were of Hispanic origin while 36.8 percent of the control group were of Hispanic origin.

**Mail return rates**—Mail return rates for the urban update/leave varied from a high of 65.4 percent in Detroit, to a low of 40.8 percent in Philadelphia. Overall, the mail return rate for the urban update/leave was 51.5 percent and the mail return rate for the control group was 61.7 percent.

Conclusions about these comparisons should be made with caution considering the inadequacies in identifying the target population and the limitations in the method used to select the control group. (1990 CPH-E-3)

### Urban Update/Enumerate

The urban update/enumerate procedure was used in selected cities to enumerate pre-identified whole census blocks of boarded up units. It was done to verify occupancy status of the buildings in question, therefore eliminating the need for the field followup vacant/delete check, and to enumerate persons living in those structures who might otherwise be missed by the 1990 census. The operation was conducted in 96 blocks in Detroit and New York.

The urban update/enumerate was planned to cover blocks consisting entirely of boarded up housing units. However, the regional census centers had difficulties identifying blocks that met that criteria. In New York, only 8.3 percent of the vacant units in the blocks chosen proved to be "boarded up." Blocks selected in Detroit were to have been vacated in preparation of the building of an airport and an automobile plant. However, due to delays in these projects, many of these housing units were occupied on census day and only 21.3 percent of the vacant units in these blocks were boarded up.

About 10.4 percent of the vacant units in the urban update/enumerate were boarded up and 86.5 percent of all units were occupied on Census Day. Consequently no conclusions can be drawn about the effectiveness of the special enumeration procedure in areas that consisted of boarded up housing units. (1990 CPH-E-3)

### Postmaster Return Questionnaire Delivery

Preliminary census results indicated that the USPS delivered 94.2 percent of the total questionnaire mailing packages just before Census Day, April 1, 1990. The remaining 5.8 percent represented packages it returned to the district offices (DO's) as undeliverable. These were called postmaster returns.

Between Census Day and the beginning of nonresponse followup (NRFU), district offices dealing with these post master returns attempted to deliver them (plus any questionnaires retrieved from the Bureau's Data Processing Division) to the designated housing units.

The evaluation of the post master return questionnaire delivery was divided into three separate components:

- Stage I: Each district office was asked to complete a survey to determine how the district office conducted the operation, to obtain estimates of the workloads, and to determine what materials were available for further analysis.

Of the 447 district offices containing mailout areas, 410 (91.7 percent) responded to the survey. STSD estimated that the responding district offices had received between 5.4 and 7.6 million post master returns, assigned between 3.1 and 4.3 million of them (approximately 57 percent), and actually delivered between 1.5 and 2.4 million (over 28 percent). About 79.5 percent of the district offices responded that the USPS had annotated the reason for undeliverability on "some" to "all" of the post master returns. Less than 10 percent of the district offices, however, maintained identification-level records about their post master return workloads.

These results prompted STSD to ask the district offices to ship their undeliverable post master returns to Jeffersonville for further analysis. There, staff took a 10-percent systematic sample of the 659 pallets received; from each of these 66 pallets, they selected with equal probability 8 cartons, or 528 cartons in all.

- Stage II: The undelivered questionnaires were sorted by USPS undeliverability reason and totals, percents, and sampling variances were estimated for each reason by final census status and type of enumeration area.

The Bureau concluded that the USPS and the district offices, together, were unable to deliver an estimated 5,272,000 (SE=460,000) questionnaires, or 6.0 percent of the mailout universe. The USPS had annotated approximately one third of the undelivered questionnaires as "vacant;" after removing these, about 3,501,000 (SE=334,000) undelivered questionnaires had "undeliverable" addresses, or about 4.0 percent of the mailout universe.

Slightly more than half of the undelivered questionnaires were enumerated as occupied (23.7 percent, SE=1.1) or vacant (32.7 percent, SE=1.7).

- Stage III: Address listing pages were reviewed to assess the universe of questionnaires delivered by census enumerators.

About 43.0 percent of the post master returns identified on the address listing pages were delivered by the district offices. Most of the housing units associated with delivered post master returns had a final census status of occupied (51.5 percent) or vacant (35.2 percent). (1990 CPH-E-3)

### Shelter and Street Night (S-Night)

The Bureau conducted the S-Night enumeration nationwide on March 20, 1990, and the early morning hours of March 21, 1990, in two phases, the shelter phase and the street phase. The first included emergency shelters, shelters for runaway and neglected children, shelters for abused women, low-cost motels, subsidized units at motels, and YMCA's and YWCA's preidentified by local areas as places where homeless people stay. The second phase covered enumeration of persons at preidentified street locations, bus stations and other places of commerce, abandoned buildings, parks, etc. Prior to S-Night, Bureau personnel worked closely with local officials to identify those areas where homeless people were likely to spend the night. (For further operational details, see ch. 6.)

The S-Night operation enumerated the following numbers of persons at each type of location:

| Type of location                           | Persons | Percent |
|--|---------|---------|
| Total.....                                 | 240,140 | 100.0   |
| Street locations .....                     | 49,734  | 20.7    |
| Emergency shelters .....                   | 168,309 | 70.1    |
| Shelters for abused women .....            | 11,768  | 4.9     |
| Shelters for runaway/neglected children .. | 10,329  | 4.3     |

Blacks and Hispanics were enumerated at higher rates during S-Night activities than they were in the total U.S. population. These higher enumeration rates indicated that S-Night activity may have helped reduce the differential undercount. (1990 CPH-E-3)

An assessment of the S-Night operation was designed and implemented to determine how well enumeration procedures were implemented and followed by enumerators at street sites and to identify external factors that influenced the street enumeration. For the assessment, researchers in five cities (Chicago, Los Angeles, New Orleans, New York, and Phoenix) placed teams of 60 in-place observers (120 in New York) at a sample of street sites that had been designated for S-Night enumeration. The cities were chosen to represent different regions and weather conditions and to include the two cities (i.e., Los Angeles and New York) believed to have the largest homeless populations.

The assessment was not designed to estimate coverage of the homeless population; however, it supported several conclusions about the limitations of S-Night street data. It was clear that street enumeration was not carried out in a comparable, standardized way in the district offices represented in the assessment in all five cities, and the variations in how S-Night was carried out affected the counts obtained. Most departures from S-Night procedures (e.g., missed sites, enumerator selectivity) would result in undercounts, although some departures from procedure (e.g., early enumeration) could produce overcounts. Variations in how S-Night was conducted implied that street counts were not comparable from place to place and should not be used to make comparisons of the absolute or relative size of the homeless population in different places.<sup>14</sup>

### Telephone Assistance Adds

The Bureau organized a toll-free telephone assistance operation (800 number) to help people who were having difficulty completing their 1990 census questionnaires. The Bureau handled requests for census forms in two ways. Prior to April 12, persons who called seeking a questionnaire were told to expect a visit from a census enumerator and were not sent a form unless their address was missing from the ACF. However, all persons calling after April 12 were sent a census questionnaire. Normal ACF maintenance procedures were followed in all cases when adding any missing addresses to the address control file. Census operators filled out a form (D-399, district office/post office record of telephone contact) summarizing the nature of every call they handled. (See chs. 6 and 8 for more detail.)

Of the approximately 992,000 persons who called census offices to request a form, around 64 percent came prior to April 12, while 36 percent were received after April 12. Estimating from a sample of these calls, it was later determined that about 158,000 (SE=6,000) were from people at addresses not on the ACF which were subsequently added to the ACF. These figures suggest that the telephone questionnaire assistance program improved the overall housing unit coverage by about 0.15 percent.

<sup>14</sup>For more details, see: Elizabeth Martin, "Assessment of S-Night Street Enumeration in the 1990 Census," *Evaluation Review*, Vol. 16, No. 4 (August 1992), pp. 418-438.



An evaluation of the characteristics of the added housing units and households revealed only minor differences between those added by telephone assistance and the general population. One difference was that the percentage of Hispanic households was higher for adds than in the general population. This may be a result of Hispanic households calling to request a Spanish language questionnaire, rather than calling to say they had not received a census questionnaire.

The telephone questionnaire assistance operation served a public need, and coverage improvement from this program proved to be a relatively inexpensive added bonus. The characteristic similarities between general population forms and telephone assistance adds provided no insight into the reason for delivery problems at those addresses. The sample data seemed to support the idea that census questionnaire nondelivery was a rather random occurrence in 1990. (1990 CPH-E-3)

### **Nonresponse Followup Adds**

Nonresponse followup was a program to enumerate households that did not mail back their questionnaires. Enumerators visited housing units in their assigned areas and completed questionnaires for the households. If additional housing units were identified during the enumeration, they were designated nonresponse followup adds. The evaluation of nonresponse followup adds was scheduled to be undertaken by STSD, however, the project was canceled due to budgetary and resource constraints.

### **Census Closeout Address Check**

Late in nonresponse followup and subsequent followup operations, the Bureau implemented a program called the census closeout address check. District offices were directed to use the USPS to obtain limited information about unenumerated cases. The program was targeted at those district offices which were late in completing nonresponse followup, but the program was recommended to all district offices.

The district offices sent out 142,356 address cards to their respective local post offices. However, Data Preparation Division (DPD) personnel checked in only 35,078 completed cards. Of these 35,078 cards, about 93 percent (32,574) came from 10 district offices (7 of which were in New York City).

DPD staff checked the completed cards for the 10 district offices to determine if there was any clustering of addresses for which the USPS provided useful information. Evidence was uncovered of slight clustering at the block and basic street-address level, but the clustering was determined to be of no practical importance.

A sample of 2,026 cases was drawn for clerical review. The sample consisted of 1 of every 25 cards from the New York regional census center (RCC) and 1 of every 7 cards from the other census centers (1,026 NY cases, 1,000 other cases). Weighted estimates from the review yielded some summary characteristics:

- The USPS reported that 86.1 percent (SE=1.1) of the cases were occupied on Census Day. The USPS did not determine occupancy status for 8.7 percent (SE=0.5) of the cases.
- Multiunit structures accounted for about 81.5 percent (SE=1.1) of all cases.
- Postal carriers were unable to determine how many people lived in an occupied unit 82.9 percent (SE=1.2) of the time. One-person occupancy was noted 8.4 percent (SE=0.9) of the time.

The study also uncovered that only about 14.4 percent of the cards completed by the post office were used to close out the cases. There are many reasons why that percentage was so low: field work was not stopped by the district offices and enumerators may have subsequently obtained more complete information for the cases and postal information may have been returned too late to use for closeout.

Planned late in the census process, census closeout address check nevertheless proved to be an inexpensive operation that aided in the closeout effort. (1990 CPH-E-3)

### **Vacant/Delete/Movers Check**

Evaluation of the 1980 census showed that followup of housing units reported as "vacant" and "nonexistent" resulted in substantial coverage improvement. That followup also provided a way to identify and count post-census day movers. The vacant/delete/movers operation for 1990 are described in chapter 6. Analysis revealed the following results:

- Nationally, a total of 10.2 million vacant and deleted units were followed up. Of these units, 2.9 million were deletes, and 7.3 million were vacant units.
  - For the Nation, the operation converted a total of 978,918 units.
  - As a result of converting 344,789 units originally classified as nonexistent (delete) to vacant or occupied, about 11.7 percent of the deleted units were added back to the national housing inventory. This represented a coverage gain of 0.34 percent for the Nation.
  - About 8.7 percent (634,129) of the total vacant units were converted to occupied.
  - As a result of converting units originally classified as vacant or nonexistent (delete) to occupied, 1,505,415 persons were added to the population count for the Nation, representing a 0.6-percent coverage gain.
- By adding higher percentages of Blacks and Hispanics than were found in the overall U.S. population counts, the operation improved the coverage of certain historically undercounted populations.
- In this operation, the average number of added persons (1.83) per converted occupied unit was substantially lower than the average number of persons per occupied unit (2.63) in the national population.

Research concluded that the vacant/delete/movers operation was effective in identifying and adding missed housing units and persons. (1990 CPH-E-3)

### **Puerto Rico Multiunit Coverage Improvement Operation**

The Puerto Rico multiunit coverage improvement operation was a clerical matching operation involving census address listing books and the mailing list of residential customers supplied by the Autoridd de Energia Elctrica de Puerto Rico (Puerto Rico Electric Company). The procedure was conducted in and around the San Juan municipio. Four district offices were included in the operation: San Juan I and II, Bayamon, and Carolina. Eligible multiunit structures were defined as any structure with at least 50 apartment units.

Analysis of the results from the combined data of the four district offices reveals the following:

- The four district offices had a total of 262 eligible multiunit structures.
- Census address registers listed 36,388 addresses, while the electric company listed 34,289. Thus, census address listing books contained 6.1 percent more listings than the electric company.
- Coverage improvement was 143 units, 0.39-percent improvement from the 36,388 units in the census address registers for the eligible multiunit structures.

There was an evaluation of the procedure, following the operation, the goals of which were to verify that the matching activities were completed accurately, determine which address listing was more comprehensive and to what extent, and complete tests for significant differences between the probability of nonmatching units and the sizes of multiunit structures. (1990 CPH-E-3)

### **Recanvass Operation**

The recanvass operation (see ch. 6) was implemented to improve coverage in areas where evidence indicated there may have been an undercount of housing units. Recanvass was a two-stage process that searched for missing addresses, identified them, and then followed up with census questionnaires at appropriate housing units.

- The recanvass operation added 138,568 housing units to the ACF. That represented a 0.14 percent increase in the number of housing units over the number prior to the recanvass. Of these added units, 21.6 percent were eventually deleted by later census operations, 29.4 percent were classified as vacant, and the remaining 48.9 percent were classified as occupied.
- Of all the added units, 86.9 percent were at city delivery addresses. One-family detached home structural type accounted for 53.5 percent of added units. (1990 CPH-E-3)

### **Primary Selection Algorithm Review**

The primary selection algorithm was developed to select the best questionnaire per census identification number when multiple first form questionnaires were data captured for the same identification number. The primary selection algorithm review was conducted during October through December 1990 to review the not selected questionnaires out of concern that persons reported on those questionnaires may be missed in the census. There were 401,174 identification numbers reviewed. The primary selection algorithm review added at least one person to 161,541 census identification numbers. The "add" rate for this operation was about 40.3 percent. Nationally, there were 350,448 primary selection algorithm review person adds. (1990 CPH-E-3)

### **Search/Match**

The search/match operation was conducted to aid in the process of enumerating all people at their "usual residence," the place where they live and sleep most of the time. This was of utmost importance for purposes of apportionment. Six different types of search forms were processed during the search/match procedure. Many people who were listed on search forms were not at their usual residence on Census Day. In an effort to ensure that they were counted, the Census Bureau searched census questionnaires to determine if they were included in the census at their "usual residence." If they had not been counted at their usual residence, they were added to the census at that address.

The search/match operation took place from July 1990 through December 1990. Completed search forms were sent to census processing offices (except for remote Alaska, where they went to a district office). At these offices, they were separated by the six form types. From this point on, search forms were organized by form type. After determining which forms were searchable, geocoding and ACF "browse" was done. This was to determine if the address was already on the ACF. If an address was found, the case went to matching/transcription which was the final stage of the search/match process—matching/transcription involved a search to determine if the search persons had been enumerated at that address. If the persons had not been enumerated on the census questionnaire, they were added to their census day address.

As mentioned above, there were six different search forms employed in the effort to correctly enumerate as many people as possible (see chap. 6 for more details):

1. Individual Census Reports (ICR's)
2. Military Census Reports (MCR's)
3. Shipboard Census Reports (SCR's)
4. Parolee/Probationer Information Records (PPIR), (PPIRFU)
5. Were You Counted? (WYC)
6. The D-190 Search Record



STSD evaluated the search/match operation by compiling estimates of the number and characteristics of people and housing units added and calculating erroneous enumeration (EE) rates by form type. The following are some results:

- A total of around 3,291,600 search forms were processed. It was estimated that 1,084,200 (SE=3,866 persons) people were added as a result of the search/match procedure. The rate of erroneously enumerated persons (EE rate) was estimated to be 44.6 percent. The actual EE rate was between 31.8 percent and 57.5 percent at 90 percent confidence interval.
- Approximately 203,000 ICR's were processed in search/match. About 36,100 persons were added to the census from ICR's (17.8-percent add rate). The estimated EE rate for ICR person adds was 15.6 percent (90 percent confidence interval for actual EE rate between 0.0 and 42.5 percent).
- Approximately 56,000 persons were added as a result of processing MCR's through search/match. This represented approximately 8.0 percent of the total MCR's received in search/match (697,400). About 79,600 SCR's were received in search/match and 14,000 (17.6 percent) persons were added to the census from SCR's. No error rates could be estimated for MCR's or SCR's because EE rates were based on PES data and there were no PES data collected for military group quarters, such as ships and military bases.
- The "were you counted" program generated 352,800 "were you counted" forms; from these documents, about 260,000 persons (SE=2,511) were added to the census. Approximately 34.6 percent of the forms resulted in an increase of at least one person. The "were you counted" EE rate was roughly 35.2 percent (90 percent confidence interval for actual EE rate between 20.4 percent and 50.1 percent).
- The D-190 search records were generated during normal census procedures and were separated into two groups—whole household usual home elsewhere (WHUHE) and those who moved close to Census Day (mover-UHE). WHUHE cases added about 162,800 persons (SE=2,645 persons) to the census with an estimated EE rate of 40.5 percent (90 percent confidence interval for actual EE rate between 10.6 percent and 70.4 percent). The person add rate was 22.7 percent. Mover UHE cases added approximately 73,100 persons (SE=1,282 persons), with a person add rate of 36.5 percent. The estimated EE rate was 58.2 percent (90 percent confidence interval for actual EE rate between 37.3 percent and 79.1 percent).

Despite the high erroneous-enumeration rates (which were not very reliable due to the relatively small sample sizes), the search/match procedure correctly enumerated more people than it incorrectly enumerated and added around 1 million people to the census. Although there was

some evidence uncovered by STSD that errors were introduced during the search/match operation, much of the error that occurred within the program could not be attributed to operational procedures.

Overall, the search/match operation added a higher percentage of males, Blacks, and Hispanics than were enumerated in the 1990 census. (1990 CPH-E-3)

### Parolee/Probationer Program

The Parolee/Probationer Coverage Improvement Program, with its followup operation, were conducted to help ensure complete enumeration, and targeted parolees and probationers, a subset of the population believed to be subject to substantial undercount. (For details, see ch. 6.) In addition, because of the overrepresentation of Black males in this population, the Bureau felt that this effort would assist in addressing the problem of differential undercount.

The Parolee/Probationer Coverage Improvement Program and the subsequent followup program added 447,757 persons to the census, representing an approximate 0.2-percent increase in the total 1990 population. The Bureau estimated that about 73.7 percent of these persons were added from the followup and the remainder from the initial program. The EE rate was estimated to be 45.1 percent (90 percent confidence interval between 32.9 percent and 57.4 percent) for the initial program and 62.3 percent (90 percent confidence interval for EE rate between 51.1 percent and 73.5 percent) for the followup program.

Approximately 27.1 percent of all person adds were Black males. By contrast, Black males represented 5.8 percent of the total 1990 population; thus it was felt that the Parolee/Probationer Coverage Improvement Program helped address the differential undercount.

Although adding housing units was not the main objective of the Parolee/Probationer Coverage Improvement Program, the combined programs added 10,937 housing units to the census files. In addition, about 18,810 housing units were units that were on the ACF as deleted or vacant that were converted to occupied when a parolee/probationer was enumerated there during search/match. (1990 CPH-E-3)

### Coverage Sampling Research

During the 1990 census, the Census Bureau conducted a research program to look at options for reducing coverage error. This program included two methodologies—a telephone reinterview of a sample of respondents that completed and returned a census questionnaire in the mail (this was conducted with the telephone coverage followup questionnaire), and a reinterview of a sample of households visited during nonresponse followup (this was conducted with the coverage followup questionnaire). The Bureau designed a review of roster to help understand the errors that respondents typically made in constructing their household roster for the census. The review of roster was on both questionnaires and probed for both potentially

missed persons and erroneously included persons. The Bureau also experimented with multiplicity and de facto coverage probes which were designed to help identify persons that may be at risk of being missed in the census. The de facto probes were on both questionnaires. The multiplicity probes were only on the telephone coverage followup questionnaire.

For this research, the Bureau selected 103 type 1 district offices which were all urban and mailout/mailback. The 103 district offices were stratified into 5 strata by variables believed to be correlated with undercoverage and difficulty in conducting field procedures. Fifty-one of the district offices were eliminated from the sampling universe by other experimental studies or by the Field Division, leaving a total of 52 type 1 district offices for the sampling universe.

The majority of the estimates of the percentages of "yes" responses to the review of roster probes on the experimental questionnaires used during 1990 coverage sampling research were relatively low (6 out of 8 point estimates were less than 1 percent). The majority of small percentages of "yes" responses seemed to infer that only a small percentage of the population had confusion constructing a household roster. The persons who seemed to cause the most confusion in constructing the household roster were college students and persons who had been temporarily away on or near census day.

Experimental coverage probes questioned the respondent about persons who were either not household members or persons who stayed at the household within a specific time frame, but were not a household member. These results showed that respondents were either not very willing to give address information about persons who were not a part of their household, or the address information was not readily available to provide to the interviewer. Although it could not be concluded that the experimental coverage probes could have any impact on differential undercount, the de facto probes showed promise for identifying a universe of potentially missed persons (see app. 11A, PREM 275).

## CONTENT STUDIES

### Master Trace Study

This study's goal was to create a data base for use in other research, evaluation, and experimentation (REX) projects and to provide data for future census evaluations. However, due to operational difficulties and budget constraints, the study was not completed. A data base would have been produced that contained an entry for all individual questionnaire items at each stage of processing and provided geographic and demographic data at various stages of census collection. Inspecting (photocopying) the specified master trace questionnaires at the various stages of operation would have allowed evaluation of individual forms at the numerous census steps through editing and imputation.

## Content Reinterview

The content reinterview survey (CRS) was the largest content evaluation of the 1990 census undertaken by the Bureau. The 1990 CRS procedure consisted of reinterviewing a sample of respondents who had completed long-form household questionnaires. The goal of the survey was to measure the response bias and variance associated with selected housing and population items. An initial sample of 15,500 housing units was used in order to obtain a final sample of 12,800 occupied units (a number comparable to the sample size of the 1970 and the 1980 CRS's). A single-stage systematic sampling design was used for the investigation.

The reinterviews began in September 1990 and ran through December of that year. Prior to the onset of the telephone interviews, the Bureau sent letters from its Jeffersonville, IN, office to the sample households informing them of the impending call. Experienced staff at the Bureau's Hagerstown, MD, office, then used computer-assisted telephone interviewing (CATI) for that contact. The CRS results were assumed to be correct and used to check the census data, so it was imperative that high quality data be collected. The quality of CATI data generally was assumed to be better than the mail or enumerator returns associated with the decennial census because of a reduction in interviewer bias. With CATI, skip patterns were computer controlled and the audio portion of the interview could be monitored by a supervisor. However, there was no attempt to measure differences in responses that could be attributed to the fact that interviews were conducted using different modes.

The CRS CATI staff attempted to have each household member over 15 years of age respond to questions dealing with personal characteristics. Cases that could not be reached by telephone were subsequently sent to the field for followup. In an effort to ensure quality results, only experienced field representatives from the Bureau's regional offices conducted the field reinterviews.

The census household roster, which contained the census person number that was necessary to match the CRS to the census, and telephone number were obtained by CRS staff. However, the interviews were independent of the census enumeration; the reinterviewer did not know how the sample household had answered the questions during the census. The CRS only measured response error; when discrepancies between CRS data and census data were revealed, no adjustments were made.

The final data collection operation consisted of 12,872 housing units and a total of 10,698 interviews (83.1 percent of total housing units). CATI handled 9,791 of the interviews (interviewing 8,857), while personal visits accounted for 3,079 (1,841 actual meetings).

### Response Error Measures

To measure simple response variance, ideally the reinterview would have been an exact replica of the census data-collection procedure. However, the CRS differed from the census in many ways:

1. The census was a mail survey with telephone and personal visit followup, while the CRS used CATI and field interviewing staff.
2. The reinterview study was conducted approximately 5 months after the census enumeration began, which possibly led to a certain amount of seasonal or recall effect.
3. The responses obtained in the reinterview could have been conditioned by the original census enumeration.
4. Anyone could answer the census questionnaire, whereas the CRS required self response from adults.
5. Political, social, or economic conditions, which may have affected response, could have varied from conditions at the time the census was undertaken.

Therefore, the CRS was not an ideal comparative study.

Nevertheless, data quality could be ascertained through measures of the bias and variance components of the total mean square error due to response error. (Response errors affected census data in that they introduced bias into the estimates of the population parameter and also created variability in the classification of a person or housing unit over conceptually repeatable independent trials of the measurement procedures, i.e., "simple response variance"). Response errors could have been introduced for many reasons during stages of the data-collection phase (see above) and also during the processing phase.

The "index of inconsistency" ( $I$ ) (the portion of the total variance that can be attributed to simple response variance) was used to analyze the impact of simple response variance on estimates. For distributions with more than two categories (e.g., race and origin), the index of inconsistency for the entire distribution was referred to as the L-fold index of inconsistency ( $I_L$ ). The indexes of inconsistency associated with the distribution helped in evaluating whether the data collection method was sufficient for providing valid measures of the characteristic.<sup>15</sup>

The objective of a response-bias type reinterview was to measure the "true" characteristics of every individual or housing unit in the sample. However, while the "true" characteristics were unattainable, the reinterview generally offered better responses than those obtained in the original survey. (The response-bias type reinterview did not ask the exact same question in the identical manner as the census. Instead, it used sequences of probing questions that called for concise answers and self-response to personal questions.) Assuming that the reinterview was a perfect second

<sup>15</sup>The interpretation of  $I$  and  $I_L$  was subjective, although generally an index value lower than 20 indicated that response variance was not a major problem. Values of the index between 20 and 50 demonstrated that there were moderate problems with inconsistent reporting and the variability in response needed improving. An index value greater than 50 indicated that the responses were unreliable and that data collection methods needed improvement, the concept might have been unmeasurable, or respondents simply were not able to provide the desired data accurately enough.

trial, the difference between the CRS and the census gave an estimate of the amount of response bias in the distribution. This "net difference rate" for a category was the expected difference between the census and the reinterview for the proportion of cases in that category.

Housing questions concerning description of building, size of lot, and agricultural sales, using the same wording as in the census, showed moderate inconsistency:

| Characteristic               | L-fold index of inconsistency |
|------------------------------|-------------------------------|
| Description of building..... | 21.9                          |
| Size of lot.....             | 27.8                          |
| Agricultural sales.....      | 42.3                          |

The estimated indexes of inconsistency broken down by tenure and type of unit, and compared with 1980 for the description-of-building question were—

| Description of building | L-fold index of inconsistency |
|-------------------------|-------------------------------|
| Owner.....              | 18.4                          |
| Renter.....             | 31.9                          |
| Single unit.....        | 16.0                          |
| Multiunit.....          | 43.5                          |
| 1990.....               | 21.9                          |
| 1980.....               | 30.0                          |

Response-bias type reinterviews were also done for various housing characteristics—tenure, number of vehicles, monthly rent, etc. A probing set of detailed questions was asked for each subject. (Some of the following results were compared with 1980 findings.)

| Characteristic           | L-fold index of inconsistency |      |
|--------------------------|-------------------------------|------|
|                          | 1990                          | 1980 |
| Tenure.....              | 13.3                          | 8.0  |
| Year built:              |                               |      |
| Single unit.....         | 26.2                          | 25.0 |
| Multiunit.....           | 36.9                          | 43.0 |
| Plumbing facilities..... | 53.8                          | 47.0 |
| Monthly rent.....        | 34.7                          | —    |
| Number of vehicles.....  | 32.1                          | —    |

All of these housing characteristics, except plumbing facilities, were reported with moderate inconsistency between the census and the CRS. The lack of consistency concerning plumbing facilities was a result of the CRS answers given in households claimed not to have complete plumbing facilities on the census questionnaire. (Complete plumbing facilities was defined as (1) hot and cold piped water, (2) a flush toilet, and (3) a bathtub or shower.) Only 44 percent of those who answered the question negatively in the census answered the same way during the reinterview.

Population characteristics were also examined during the CRS, with response-variance type reinterviews on the following population items: hispanic origin, school enrollment, year of immigration, and employment—industry. The

estimated indexes of inconsistency were in the low range for the data on Hispanic origin and school enrollment and in the moderate range for year of immigration and employment data.

| Characteristic          | L-fold index of inconsistency |        | Total |
|-------------------------|-------------------------------|--------|-------|
|                         | Male                          | Female |       |
| Hispanic origin .....   | 12.5                          | 11.7   | 12.2  |
| School enrollment ..... | 16.6                          | 18.0   | 17.3  |
| Year of immigration ... | 23.0                          | 22.8   | 23.2  |
| Employment history ...  | 32.6                          | 34.7   | 30.4  |

In the Hispanic-origin question, four of the five response categories showed extremely low levels of variability:

| Hispanic origin                  | L-fold index of inconsistency |
|----------------------------------|-------------------------------|
| No, (not Spanish/Hispanic) ..... | 9.3                           |
| Yes, (Mexican, Chicano) .....    | 8.5                           |
| Yes, (Puerto Rican) .....        | 8.6                           |
| Yes, (Cuban) .....               | 13.6                          |
| Yes, (other Spanish/Hispanic) .. | 34.1                          |

Data were not significantly different by sex for the Hispanic origin question or any of the other population items except for type of industry. Females reported this item more consistently than males.

A CRS section had a probing set of response-bias type questions on population characteristics, with the intent of clarifying the answers to the original census questions. Most items were reported with low or moderate levels of inconsistency, although one disability item showed high levels:

| Characteristic                                     | L-fold index of inconsistency |      |
|--|-------------------------------|------|
|  | 1990                          | 1980 |
| Place of birth .....                               | 4.9                           | 6.0  |
| Military service .....                             | 8.5                           | —    |
| Citizenship .....                                  | 10.9                          | 13.0 |
| Race .....   | 16.3                          | —    |
| Other language .....                               | 26.9                          | 25.0 |
| Industry and occupation<br>(class of worker) ..... | 27.5                          | 35.0 |
| Educational attainment .....                       | 32.3                          | 35.0 |
| Disability .....                                   | 43.0                          | —    |
| Work disability .....                              | 45.7                          | —    |
| Mobility limitation .....                          | 47.1                          | —    |
| Self-care limitation .....                         | 73.6                          | —    |

The race portion of the reinterview showed that Whites were underreported in the census from 0.3 to 0.7 percentage points, and Other Race was overreported from 0.4 to 0.7 percent. The data for race was divided into Hispanic and non-Hispanic.

| Race                   | Non-Hispanic | Hispanic | Total |
|------------------------|--------------|----------|-------|
| White .....            | 0.1          | -10.4    | -0.5  |
| Black .....            | 0.1          | -3.5     | -0.1  |
| Indian/Eskimo/Aleut .. | —            | 0.7      | —     |
| API .....              | -0.1         | -0.4     | —     |
| Other API .....        | —            | 2.4      | —     |
| Other Race .....       | -0.1         | 11.2     | 0.6   |

Non-Hispanics represented over 94 percent of the total population and the race data for this group contained no bias. However, the race data for all people showed significant bias in the "White" and "Other Race" categories. Therefore the Hispanic population appeared to have had difficulty classifying themselves into the race categories and contributed most of the bias in the census race data. (1990 CPH-E-1)

### Alternative Questionnaire Experiment

The alternative questionnaire experiment (AQE) consisted of a mailout/mailback survey of five alternative long-form (i.e., sample) census questionnaires. Approximately 42,000 randomly selected housing units in type 1 areas (metropolitan areas) were sent one of the six variant forms. (One of the forms was a control questionnaire, a replica of the "traditional" long form.) The survey was conducted in processing offices with the sampled addresses taken from the ACF short-form listings. All completed forms were mailed to the Bureau's Jeffersonville, IN, facility for processing.

The experimental design behind the various forms was to vary the long-form questionnaire a little more with each subsequent alternative. Changes represented stages of modification; each form added a few alterations to the previous modifications that had been retained. Thus, form 6 deviated the most from the control questionnaire. The goal of the experiment was to determine how various changes to the traditional census form would improve response rates.

#### AQE forms—

##### Panel 1 (control form)

Panel 1 was identical to the long forms mailed out during the census, except a motivational insert was deliberately omitted. (The insert was included in the regular census mailing and provided respondents with information about why the census was important and how census information is used.) No panels in the AQE contained the motivational insert.

##### Panels 2 and 3 (internal changes)

These two panels altered wording, format, and/or question order while very closely resembling the control panel's physical construction. The goal was to make the questionnaire more "user-friendly" while maintaining the same structure. The ordering of just three questions distinguish panel 2 from panel 3. Two of the experiments took place in the 100-percent population section while the third was in the housing section.

#### Panel 4 (booklet form)

Panel 4 introduced major structural changes from the control form. While changes from panel 2 were retained, panel 4 introduced a booklet format that kept all population and housing questions together. On the standard long form, the questionnaire had all the 100-percent questions first, followed by all the sample questions. Panel 4 instead asked all population questions first and finished with all the housing questions.

#### Panels 5 and 6 (kit panels)

These final two experimental questionnaires varied drastically from the control panel. They introduced not only structural but content and coverage changes. Panels consisted of two separate forms, one for collecting person information and one for collecting housing information. Each kit included nine separate person forms and one housing form. Having nine person forms allowed for two more people to be enumerated than on the standard form, which only had room for seven people. Separate forms allowed each person in the household to complete an individual questionnaire. Panels 5 and 6 were identical in physical structure, but to test the effect of anonymity, questionnaire 6 did not ask the names of the respondents. Questions asking name, telephone number, relationship, and address of workplace were eliminated from panel 6.

The alternative long forms were mailed out on March 23, 1990, and shortly after Census Day (April 1, 1990), the office in Jeffersonville was charting AQE mail response rates. Compared with regular long-form questionnaires, return rates were quite low. By the time of nonresponse followup, the regular long-form response rate was 53 percent while the cumulative AQE response rate was 47 percent. The final AQE mail response rate, tallied on August 30, 1990, was 51 percent.

This difference in response rates, coupled with the fact that all the response rates to the AQE panels were low, suggested that lag time, logistical problems with USPS, and the return of forms to processing offices by mistake all contributed to the end result. This affected panel 1's utility as a way to evaluate the effectiveness of the motivational insert, and that evaluation had to be abandoned. However, panel 1 could still act as a legitimate control to the AQE forms because they too would have faced all of these difficulties.

#### Mail Response Rate by Panel

| Item               | Panel |      |      |      |      |      | Total |
|--------------------|-------|------|------|------|------|------|-------|
|                    | 1     | 2    | 3    | 4    | 5    | 6    |       |
| Mail response rate | 48.2  | 48.6 | 49.9 | 51.8 | 52.5 | 54.3 | 50.9  |

AQE response rates increased significantly as one moved away from control panel 1. No significant differences were found between the initial three panels' response rates. Differences among these forms were minute and the physical construction of these three forms was identical.

However, the panel 4 response rate was 3.6 percentage points higher than the control response rate, a difference which was significant. This was the first form with a structural departure from the control questionnaire. This "booklet" was also mailed in a large envelope which stood out in the mail; that could have added to the response rate.

Panels 5 and 6 both had significantly higher response rates compared with the control panel. The mail-response rate for panel 5 was 52.5 percent, and for panel 6, 54.3 percent. The 10 separate forms contained in the two "kit" questionnaires apparently did not deter people from completing the form. The instructions for these panels were concise and the most straightforward of all of the panels. The difference between panels 5 and 6 was also significant. That was particularly interesting because the only distinction between those two panels was that panel 6 was "nameless" — names were not asked and the questions concerning relationship and name and address of work were eliminated.

The mail-response rate for three of the five AQE panels differed significantly from the control-panel response rate. However, while the overall mail-response rates were superior, the booklet and kit panels suffered from nonresponse to whole sections of data. Respondents to these panels were more likely to skip entirely all the population or all of the housing questions. This resulted from the structure of these questionnaires, since all housing questions were placed at the end of the questionnaire in panel 4, and housing questions were sent as a separate form in panels 5 and 6. Nevertheless, in all three cases the superior mail response rates made up for inadequacies in the collection of group population and housing data (see app. 11A, PREM's 108 and 146).

#### Macro Level Consistency Check

Macro level consistency checks with external sources were slated to be an element of the content evaluation of the 1990 Decennial Census. However, the study, which would have compared census counts with counts from other sources (the 1990 Current Population Survey, State data, medicare data, etc.), was canceled due to budgetary and time constraints.

The study was planned as a collaboration between Population Division (POP) and the Housing and Household Economic Statistics Division (HHES) with support to be provided by the Program and Policy Development Office (PPDO). Potential sources were to be systematically identified and subsequently compared to 1990 census data at the state and national level. Computerized tables were to be developed for each item from the complete count and from the sample questionnaires at the appropriate geographic level. POP and HHES were then to enter the census data and the external source data into the tables and compare them against established tolerances for each item. Those data items that failed tolerance were to be analyzed, and the tables and corresponding text published to coincide with the release of the 100-percent State



reports in early 1991. The sample results and final report were scheduled for publication in early 1992.<sup>16</sup>

## COVERAGE STUDIES

### Post-Enumeration Survey (PES)<sup>17</sup>

**Background**—The 1990 PES was designed to measure net coverage errors in the decennial census. The PES evaluated coverage on a case-by-case basis, while DA relied upon aggregated data. Historically, the Census Bureau used statistical and demographic methods for evaluation purposes (see "Introduction," pp. 3-5), but for more than a decade prior to 1990, there had been a political and legal controversy about whether these same methods could or should be used to adjust the census results for the undercount. (See ch. 12, "Legislation and Litigation"). In 1989, litigation (*The City of New York versus United States Department of Commerce*) led to an agreement that the Census Bureau would evaluate the 1990 census through a survey, which the Secretary of Commerce could take into account when deciding whether to adjust the census results—which he had to do no later than July 15, 1991.

The Bureau staff chose the 1990 PES as the method for producing census tabulations for States and local areas corrected for the population undercount or overcount. There were several stringent requirements: The PES had to have estimates no later than May 17, 1991, (less than 11 months after PES interviewing would begin). It had to produce "corrected" census tabulations from these estimates by July 15, 1991. Because of the importance of the census data and the small size of the net undercount in the raw enumeration, the PES had to meet high quality standards in terms of missing data, matching errors, and other nonsampling errors. Further, the survey procedures, to be carried out principally during the census itself rather than afterwards, would have to be specified for all to see before data analysis began.

The following Bureau divisions participated in the PES with much the same functions as they had in the census: Statistical Research (SRD), Statistical Support (STSD), Field (FLD), Decennial Operations (DOD), Data Preparation (DPD), Geography (GEO), Decennial Planning (DPLD), and Population (POP).

**Design**—To maintain autonomy from the census going on at the same time, the PES and its followup enumeration were managed out of the 13 regional census centers

<sup>16</sup>K. Hansen (POP), P. Fronszek (HHES), and G. Gates (PPDO), Memorandum, May 31, 1988.

<sup>17</sup>This section relies on the following article: Howard Hogan, "The 1990 Post-Enumeration Survey: Operations and New Estimates," *Journal of the American Statistical Association*, Vol. 88, No. 423 (September 1993), pp. 1047-1060. Also see PREM 202. This paper includes a discussion of post-1990-census work at improving estimates that is outside the scope of this history. A 1990 Decennial Census Informational Memorandum, No. 148, issued May 20, 1991 (but written before the PES began), "1990 Post Enumeration Survey (PES) Requirements Overview," describes the entire operation and its anticipated logistics from 1988 to July 1991.

(RCC's) instead of the local district offices. The basic structure of the PES consisted of sampling persons to determine their census day residence and to ask them for names and characteristics. This information was then taken back to one of the seven census processing centers (processing offices), where census records for the appropriate geographic area were searched to ascertain whether the person had been enumerated correctly.

The 1990 PES consisted of a sample of nearly 172,000 housing units in 5,290 sample block clusters, or 7,500 blocks out of 7 million in the 50 States and the District of Columbia. (As late as 1987, it had been proposed that the 1990 PES would have a universe of 300,000 housing units, but for budgetary reasons, that number had to be halved.) There was oversampling in areas with American Indian reservations and tribal trust lands and in areas with significant Black, Hispanic, or Asian populations. (The PES in Puerto Rico is described in chapter 13.)

To generalize the total population, people were divided into groups called poststrata. The staff estimated the "true" population for each poststratum and compared that with the poststratum's census counts. The ratio of the PES estimate of the true population to the census count was called the "adjustment factor."

The poststrata were defined by the following characteristics: Region (4) Northeast, South, Midwest, West. Census division (9) New England, Middle Atlantic, South Atlantic, etc. Race (4) Black, non-Black Hispanic, Asian and Pacific Islander, non-Hispanic White and Other. Place/size (7) Central city of major metropolitan area, central city of other large metro area, etc. Housing tenure (2) Owner, nonowner. Age (6) 0-9, 10-19, 20-29, 30-44, 45-64, 65 and over. Sex (2) Male, female.

After reducing the number of small cells into 116 poststrata groups, the poststrata groups were divided into sex-age categories to produce 1,392 poststrata.

**P- and E-samples**—The 1990 PES embodied two parts, both using the sample block clusters mentioned above: The P-sample was the sample of the population; it consisted of all people living in the sample blocks at the time of the PES interview, and it measured the proportion of persons missed by the census. Thus, the proportion of the P-sample found in the census was estimated to be the proportion of the total population enumerated in the census. The E-sample consisted of all the census enumerations coded to the sample blocks, whether or not they actually belonged there. (The PES sample excluded people living in institutions (such as jails or nursing homes), military living in barracks or on ships, and people living in homeless shelters or counted on the street.) The E-sample was used to estimate the proportion of erroneous census enumerations. The staff checked the E-sample enumerations against the census itself to determine the extent of duplication, and again in the field to determine the extent of fictitious enumeration, inclusion in the census of people born after the census reference day (April 1, 1990), and the extent to which people were counted in the wrong location.

A dual-system model was used to estimate the "true" population; it conceptualized each person as either in or not in the census, as well as either in or not in the PES:

| PES         | Census enumeration |          |          |
|-------------|--------------------|----------|----------|
|             | Total              | In       | Out      |
| Total ..... | $N_{++}$           | $N_{+1}$ | $N_{+2}$ |
| In .....    | $N_{1+}$           | $N_{11}$ | $N_{12}$ |
| Out .....   | $N_{2+}$           | $N_{21}$ | $N_{22}$ |

All cells in the matrix could be observed except  $N_{22}$  and any of its derivatives. That is, all persons could be examined except those who were left out of both the decennial census and the PES. (The model's success depended on a number of assumptions: The design assumed the placement of all people in their correct cells. It also assumed independence between the census and the PES, but that might not hold in two cases—causal dependence between the two systems and heterogeneity in the population. Causal dependence occurred when a person answered the census and then refused to cooperate with the PES, thinking he/she had helped enough. Heterogeneity occurred when people could not be reached for both the census and the PES. Correlation bias was the end result of these independence failures.)

Working backward from the PES's July 15, 1991, absolute deadline, the staff decided that PES matching had to be completed by mid-January 1991, PES followup had to begin by early November 1990 and be largely finished a month later. Therefore, before followup matching had to run from early September 1990 to late October. On the other hand, PES interviewing could not begin until after NRFU was over. The official schedule called for NRFU to end on June 6, 1990, so the staff chose June 25, 1990, as the date to start. Even that had to be delayed in some areas, where NRFU was late. PES interviewing was completed in most areas by the end of July and finished everywhere by early September; however, this meant an increased time gap between the PES and Census Day (April 1) and also compressed the time for the ensuing PES operations.

PES field work began before Census Day, when permanent field representatives from the Bureau's regional offices (RO's) visited each sample block to list all housing units and group quarters. The PES interviewers who followed later were largely temporary employees under RCC direction (most of them had been census enumerators). To help ensure the PES's independence, they were assigned areas other than those they had canvassed in the census. Their principal task was ask for the same basic demographic information as the census had, plus a battery of questions to help in matching. Their aim was to obtain a complete listing of the current household and determine each person's residence on Census Day and also to identify any persons who were there on Census Day but not living in the household.

As the scheduled interviewing was finishing, there were concerns about whether the level of PES response was unacceptably low, especially in a few regions. In those

areas with an initial nonresponse rate of more than 2 percent, the staff sent over 3,700 PES nonresponse cases to the regional offices, where their field representatives obtained interviews in 70 percent of their visits during September.

PES interviewing was subjected to QA evaluation based on a sample of work units (completed interviews and vacancy reports only) that varied from 1-in-3 for areas with high minority or high rental percentages to 1-in-6 elsewhere. (Many work units contained only a few questionnaires; that caused a much higher sampling rate there.) An RCC office edit checked for interviewer errors and omissions, and for verification purposes, a sample of households was recontacted by telephone or personal visit. The QA evaluation estimated that 0.91 percent (1,400 cases) of the PES-interviewed housing units showed a discrepancy of one or more persons between the PES questionnaire and the QA reinterview; in high minority/rental areas, the estimated household roster error rate was 1.38 percent. Of the 1,400 cases, the QA operation was able to correct 644 (46 percent). Roughly half of the 1,400 cases had household members omitted, while the rest had some or all erroneous people-entries (see app. 11A, PREM 196). Table 1 reflects the listing and interviewing results.

**Table 1. Initial PES Interviews by Outcome**

| Item                               | Total   | Housing units | Group quarters | Percent of occupied units |
|------------------------------------|---------|---------------|----------------|---------------------------|
| Listed units .....                 | 171,378 | 168,782       | 2,596          | —                         |
| Deleted units .....                | 5,283   | 4,512         | 771            | —                         |
| Total housing units .....          | 166,095 | 164,270       | 1,825          | —                         |
| Vacant .....                       | 22,247  | 21,080        | 1,167          | —                         |
| Occupied .....                     | 143,848 | 143,190       | 658            | 100.0                     |
| Interviews household members ..... | 134,808 | 134,478       | 330            | 93.7                      |
| Other .....                        | 6,745   | 6,493         | 252            | 4.7                       |
| Noninterviews .....                | 2,265   | 2,189         | 76             | 1.6                       |

**Processing office operations**—Each of the seven census processing offices had a PES branch, divided into control and matching sections. The branch chief reported to the processing offices assistant manager for processing operations, and the PES Staff in the DOD at Bureau headquarters coordinated the PES work in the various processing offices. This branch also handled similar processing for the Housing Unit Coverage Study (HUCS; see p. 34) and used the PO facilities (such as the control and tracking system (CATS), the automated quality assurance (QA) system, and the electronic mail system used to refer problems, etc.) in much the same manner as in census processing. (See ch. 8.)

The control section had three units—central control, geocoding/preparation, and MAD (microfilm access device) search. The central control unit was responsible for all control and tracking functions; these included setting up



and maintaining the PES library,<sup>18</sup> assigning materials for all the PES clerical operations, tracking all the PES materials through the operational flow, and checking in and out materials to or from the field. The geocoding/preparation unit performed all the clerical operations related to the address listing books (ALB's, form D-1302) and preparing the PES interview forms, and it did all of the geographic coding needed for the PES matching. The MAD search unit printed copies of census questionnaires for movers and other cases, and also maintained the film library.

The matching section performed all of the matching operations, as follows:

Before followup processing—

Nonmover matching

Mover matching

Followup processing—

Preparation of followup forms

Late census data matching and preparation of followup forms

Surrounding-block search for mover matching

After followup processing—

Nonmover matching

Mover matching

Followup form data entry

There were various units (here called "groups") of clerks and technicians that dealt with various kinds of cases (e.g., movers, nonmovers, or special situations) and had functions ranging in complexity. A specially-trained group of matching review specialists reviewed cases with high nonmatched rates in an effort to reduce the matching error.

**Matching**—For the purpose of the dual-system estimate, a person was considered enumerated by the census if his/her name appeared on a census record that was included as part of the population count. A person was considered omitted from the census if he/she should have been part of that count but was not. Matching classified persons as enumerated only if they were counted at the location where they should have been, according to the information they provided. For example, the census could miss people moving between April 1 and the end of NRFU (June or later) at their correct Census Day address but erroneously count them at their new address. The PES considered these people as missed by the census, and the census enumeration at the new address would be classified as "erroneous" in the E sample. If both addresses were in the same poststratum, the errors would tend to cancel.

Matching did not require an exact address; if persons were reported as living at a given address, the match classified them as correctly enumerated if they were counted anywhere in the block where the address was located, or in

<sup>18</sup>A quality-assurance program for the library, in which the materials on the shelves were sampled for filing accuracy, estimated that 1.17 percent of the block clusters contained at least one misfiled questionnaire on any given day, but that such misfiled questionnaires would be located or regenerated (see app. 11A, PREM 176).

a ring of surrounding blocks (the "search area"—one ring in urban areas, two in prelist (rural) areas, and the whole Address Register Area in list/enumerate (very rural) areas). Census enumerations outside the search area of the true location (even though in the same town or city) were classified as erroneous so that the overall estimate of net undercount would not be inflated. Some cases lacked sufficient information to decide whether the person had been enumerated; these cases were called "unresolved" and the information was imputed. In the P sample, an unresolved case would be one without a name or an interview where a Census Day address was not reported.

To determine whether a person in the P sample had been enumerated in the census, the match began by a computer comparison of the individual characteristics and address on the P-sample record with the census record, where the latter was indexed only by geographic location—not name. Clerks keyed the names of all people enumerated in the search area to assist in the match.

Computer matching, scheduled to begin on August 9, 1990, had to be delayed until the census files were available, but it proceeded rapidly and was completed by the end of September. Clerks then reviewed all non-matches and possible matches (as well as all PES nonresponse cases that the field interviewers had succeeded in completing). The computer could not match persons who had moved into the PES address from outside the search area after Census Day, since it had no names from the census keyed for them; for these, clerks tried to find the Census Day address by its geographic code, search the census record on microfilm, and assign a match code.

**PES followup**—PES followup had several purposes—to remove fabricated cases from the final data files and to resolve possible matches among reported movers, but mainly to determine the correct Census Day address. The staff used initial match codes assigned to all cases before PES followup in a missing-data imputation model to predict the enumeration status for cases that could not be interviewed during followup.

All whole-household nonmatches went to followup (fabrications by PES interviewers tended to fall into that category), as did all nonmatch cases where the initial interview had not been with a household member. There was no guarantee, however, that the information reported in the autumn would be more accurate than that collected in the summer. Most unmatched P-sample cases were sent to the field representatives for personal-visit followup in late November and early December. Clerks in the census processing offices prepared the questionnaires for these followup cases, and their work was subjected to QA, particularly to see that all critical information needed for an interview had been recorded. QA found that error rates tended to fluctuate or increase over time, occasionally corresponding to the workload (see app. 11A, PREM 115).

After followup, clerks assigned final match codes, which provided important information when studying the nature of census errors beyond the question of the net undercount.

**Measuring erroneous enumerations**—The E sample measured the proportion of erroneous census enumerations. The design considered an enumeration as correct if it was not a duplicate and (according to the information provided) the person should have been counted either in the sample block or its search area. In addition to census duplicates, erroneous enumerations included fictitious persons; persons who were born after, or died before, Census Day; people counted in the wrong location; census enumerations with insufficient information to allow both PES matching and followup reinterview; and, as noted earlier, people who moved into the search area from outside after Census Day and were counted there in the census. (Moving from one address to another, both within the search area, was acceptable as long as the person had been enumerated only once.) The PES used information gathered from the P sample to code the E sample whenever the records from the two samples matched.

Through procedures known as “last resort information” or “closeout” in NRFU, the census might contain only minimal information indicating the presence of an individual without a name, and/or data substituted from another record (see ch. 6). These cases could not be matched accurately to P-sample cases, nor were they sent to PES followup to see whether the persons were real and lived at the address on Census Day. For purposes of the PES estimates, these were all classified as not being in the census, but they were included in the census counts when computing net coverage error or applying adjustment factors.

Whether census enumerations that occurred after November 1, 1990, got into the PES system and to what extent, depended on how late the records arrived. Some census cases enumerated in November and December were included in the census counts but not in the PES; constituting 0.1 percent of the E sample for nonminorities and 0.4 percent for minorities, these cases introduced an upward bias into the dual-system estimate if they either should have matched or should have been classified as erroneous enumerations.

**Estimation**—Table 2 gives the level of missing enumeration status. The overall level was low, but as expected, the pattern of PES response roughly paralleled that of the census.

**Table 2. Percent of Cases Unresolved, by Race/Ethnic Group**

| Race/ethnic group               | P-sample | E-sample |
|---------------------------------|----------|----------|
| Non-Hispanic White and Other..  | 1.6      | 0.7      |
| Black .....                     | 2.5      | 2.1      |
| Hispanic.....                   | 2.5      | 1.8      |
| Asian and Pacific Islander..... | 2.0      | 1.3      |
| American Indian.....            | (NA)     | (NA)     |

NA Not available.

The missing-data adjustment began by reweighting response cases, within the block cluster where possible, to account for the whole-household noninterviews. Next, the process

imputed any missing demographic characteristics so that each case could be assigned to a poststratum. For example, if race was missing, it was imputed based on the race of other household members or neighbors. Age was imputed based on the distribution of the response cases with similar other characteristics.

To account for unresolved enumeration status, a large logistic-regression model was fit to P-sample data for which enumeration status had been observed. This model was used to predict the probability of “correctly enumerated” versus “omitted from the census” for unresolved P-sample cases. A separate logistic-regression model was fit to resolved E-sample individuals to predict the probability of “correctly enumerated” vs. “erroneously enumerated” for unresolved E-sample cases.

Dual-system estimates (DSE's) then were made for each of the 1,392 poststrata, assuming independence of inclusion in the census and the PES. While computing the DSE's, two block clusters were identified that exerted extremely large leverage on the estimates. (Leverage, in this context, was defined as the absolute value of the difference between the weighted number of nonmatches and the weighted number of erroneous enumerations for the cluster.) Both of these clusters had been drawn from a special sample of census blocks where few housing units were expected and low sampling probabilities (and correspondingly high sample weights) had been applied. The possibility of such cluster outliers had been anticipated. Accordingly, both block clusters were downweighted and the DSE's recomputed.

**Smoothing and synthetic estimation**—It also had been anticipated that many of the 1,392 poststrata adjustment factors would have variances too high for them to be useful for adjustment. One way to reduce the variance would be to form fewer poststrata, i.e., to assume homogeneity across broader categories. As noted on page 19 and described below, this was done for the PES. For the census adjustment estimates, however, a regression-smoothing approach was adopted. It fitted a regression model to predict the adjustment poststratum factors in such a way that it allowed for sampling error. The regression-predicted factor then was “averaged” with the observed factor to form the smoothed factor, thus “borrowing strength” from many cells.

The observations were the adjustment factors for the 1,392 poststrata. The model was fit separately for the four census regions and a reduced model was used for the special American Indian strata. The variables used to form the poststrata, expressed as “indicators,” were also used as predictors; if categories were combined, the variables were expressed as proportions. For example, when Blacks and Hispanics were combined in one poststratum, the “Black” indicator would be the proportion of Blacks in that poststratum and the “Hispanic” indicator would be its complement. There were indicators for race and Hispanic origin, age category, tenure, census division, and place/size category. The model allowed interactions between race

and place/size, among age-sex-race, and among age-sex-tenure. Other variables measured the difficulty in taking the census, including the proportion of people enumerated on questionnaires returned by mail as an index of public cooperation with the census. The proportion of census whole-person substitutions measured the extent to which the census relied on imputation. Another variable indicated the proportion of enumeration by door-to-door canvassing, a method used primarily in remote rural areas.

Indicators for race, age, and tenure were forced to enter the model, with the other variables selected based on their predictive power. The "predictor" (independent) variables were selected using a best-subsets regression. To meet the requirement of prespecification, the staff chose this approach over more subjective ones.

Experience from earlier tests and theoretical considerations suggested that the estimated sample variances would be higher for large or very small estimated adjustment factors, and this proved to be so. If the sample estimated variances had been related only to the true adjustment factors, this dependence would have been appropriately accounted for in the generalized least-squares fitting of the model and subsequent smoothing. However, it was likely that the sampling errors of the estimated variances would be positively correlated with the sampling errors of the estimated adjustment factors, and that might result in under- or over-weighting. For this and other reasons, the poststratum variances were "presmoothed," the PES factors were put through several iterations. As a final step, the smoothed factors were ratio-adjusted so that, for each census region, the smoothed undercount would equal the directly estimated undercount.

The census adjustment estimates showed a net national undercount of 2.1 percent. Higher undercounts were measured in the South and West and lower undercounts in the Northeast and Midwest. The levels and patterns of the measured undercounts largely followed expectations: They tended to be higher for Blacks, Hispanics, and Asians and were high for nearly all nonowner poststrata groups. Low undercounts tended to be seen in suburban areas and small towns.

Smoothing produced an unexpected result among the South's census divisions, however. The unsmoothed estimates were highest for South Atlantic (3.5 percent) while the undercount rates for East South Central and West South Central were much lower, 1.2 and 2.1 percent, respectively. Each had an estimated standard error of 0.6 percent. Smoothing brought all three divisions together, lowering South Atlantic to 2.6 percent, and raising the other two—East South Central, 2.4 percent, and West South Central, 2.9 percent.

Several poststrata groups were of special concern when smoothed and unsmoothed results were compared. In New England central cities and in East North Central division "other" (i.e., rural) areas, the PES measured a large overcount that smoothing reduced but did not eliminate. Due to the limited sample sizes for Hispanics in the Northeast region, there were only two separate Hispanic

poststrata groups (New York City, and central cities of other large metropolitan areas), with an additional three groups where Hispanics were combined with Blacks. The two Hispanic groups had unsmoothed estimates of 4.0 percent (standard error, 3.8 percent) and 9.9 percent (standard error, 6.1 percent). Smoothing reduced these estimated undercounts to 1.7 and 2.0, below the national average. In the West region, the original unsmoothed estimate for Blacks in Pacific noncentral-city metropolitan areas was 14.3 percent, among the highest measured; smoothing raised that estimate to 16.4 percent. Table 3 expresses the estimated national undercount by race/ethnic origin and tenure.

**Table 3. Percent Undercount by Race/Ethnic Origin**

| Race/ethnic origin                     | Total | Owner | Nonowner |
|--|-------|-------|----------|
| Non-Hispanic White and Other . . . . . | 0.7   | -0.3  | 3.1      |
| Black . . . . .                        | 4.6   | 2.3   | 6.5      |
| Hispanic . . . . .                     | 5.0   | 1.8   | 7.4      |
| Asian and Pacific Islander . . . . .   | 2.4   | -1.4  | 7.0      |
| Reservation Indian . . . . .           | 12.2  | (NA)  | (NA)     |

NA Not available.

The estimated undercount was distributed geographically below the poststratum level by multiplying the poststrata adjustment factors by census counts for each poststratum in each block in the census. Using the block level assured that all subsequent tabulations based on the adjustment were consistent. The census counts for groups excluded from the PES frame (e.g., the institutional population) remained unchanged.

Had the census been adjusted based on these PES results, the official count of the resident population would have increased by 5.27 million, putting that count just under 254 million for 1990. Of the increase, 1.5 million (29 percent) would have been Black; 1.2 million (23 percent), Hispanic; 231,000 (4.0 percent), Asian and Pacific Islander; and 99,000 (1.9 percent) American Indian. The remaining 1.64 million (42.1 percent) were non-Hispanic Whites and other races. These were net numbers, as there would have been 6.19 million records added for net undercounts and 919,000 removed because of net overcounts. After imputing the count-adjustment record, the adjusted files were created in time for the July 15, 1991, deadline.<sup>19</sup>

**PES evaluation followup**—In the spring of 1991, a reinterview program evaluated the PES as part of the Bureau's plan to measure the PES undercount estimates. This involved having field representatives from the regional offices revisit approximately 11,000 PES households formed into 13 poststrata, using 2 separate questionnaires—the regular PES followup questionnaire for about 2,500 P-sample cases and a revisit questionnaire (designed specifically for

<sup>19</sup>The appendix of the paper cited in n. 1 above (see app. 11A, PREM 202) contains tables showing the direct and smoothed percent-undercount estimates by poststratum group and counts and undercount rates by State.

this evaluation to study address misreporting and errors associated with that) for about 8,200 P- and E-sample cases. The operation achieved a response rate of approximately 98.5 percent, even though the reinterview took place up to 10 months after the initial PES contact with the household.

The EFU results provided empirical data to evaluate specific components of response error in the PES (address misreporting, fabrication of P-sample cases, etc.) and concluded that the PES results were of high quality. Erroneous enumerations and fabrications had not had any significant effect on the PES estimates of the net undercount (see app. 11A, PREM 183).

**Related evaluation studies**—Several studies within the Bureau considered the PES, alone or in conjunction with other statistical measures.

One of these looked at the internal consistency of estimates with two objectives: (1) To evaluate the reasonableness of the age-sex distribution in the census and PES estimates, and (2) to compare the PES and demographic analysis (DA) estimates of undercount and thus make some assessment of the PES estimates' accuracy. It used sex ratios and undercount rates from both; because DA estimates were at the national level only, most comparison was limited to analyzing national data by race—Black and non-Black. At the national level, analysis of the sex ratio indicated no major differences in the age-sex composition of the population for the different data sources (i.e., the census, the P-sample, the E-sample, and the unsmoothed PES). At the PES evaluation-stratum level, the sex ratios were more often lower for the minority strata than for the nonminority strata—a first indication that males had lower coverage than females for minorities. The analysis saw higher sex ratios based on the unsmoothed PES than the census data. (Smoothing the PES caused no appreciable difference, but the sex ratios based on the smoothed PES fell short of the expected DA sex ratios, especially for the total Black population—by almost 5 percentage points. For that population for ages 20 to 64, the differences ranged from 7 to 9 percentage points.) The study concluded that the PES fell short of DA when capturing coverage differences existing between Black males and females.

Comparative analysis of the PES and DA undercount rates found several similarities as well as some major disagreements. With regard to similarities, the DA and PES estimates of undercount for non-Black males and for Black and non-Black females were within the combined confidence interval formed by uncertainty intervals for the DA estimates and variance for the PES estimates. There also was agreement between the PES and DA about the undercount for the age group 0-9, which seemed to be least affected by the undocumented immigration. Since the birth and death statistics from administrative records were considered accurate, the DA should have estimated the 0-9 undercount relatively accurately. Thus, the observed agreement between the PES and DA estimates of the 0-9 undercount spoke well for the PES.

The study found several differences that it considered important: (1) The PES estimates of undercount for Black males over age 20 were significantly lower than the DA estimates, possibly because of correlation bias in the PES, i.e., the underlying reasons that made it difficult to enumerate Black males in the census in the first place also made it difficult in the PES. Of the total number of Black males enumerated in the census, close to 5.4 percent were excluded from the PES universe, as compared with only 1.7 percent for non-Black males; (2) For the 10-19 age group, the PES estimate, regardless of sex or race, was consistently higher than the DA estimate. (DA estimated a census overcount for the non-Black, 10-19 population.) Some PES analysts felt that the PES overstated the undercount for this age group because the census had counted students both at home and at school (despite instructions to the contrary) and the PES had failed to identify a proportion of those duplicates; (3) The PES undercount estimates for Black and non-Black females were higher than those from DA (there had been a similar finding for 1980), but the 1990 study could not find a sound explanation for this (see app. 11A, PREM's 68 and 96).

Another project explored and reported on various ways to evaluate both the components of error and the total error in the PES estimates for 13 evaluation poststrata. (The components of error were response correlation bias (model bias), matching error, quality of the reported Census Day address, fabrication in the P-sample, processing and data-collection error in the E-sample, error in balancing the estimates of the gross overcount and the gross undercount, missing data (imputation error), sampling variance, and ratio estimator bias. The staff did not examine error in balancing separately because operational considerations forced that to be incorporated in other error components. The evaluation of total error assessed the overall accuracy of the PES estimates of population size and the census undercount rate. A synthesis of the component errors provided estimates of the bias and variance. The analysis assessed the combined effect of all the errors on the PES estimate of the undercount rate. The estimates of the mean and variance of the distribution of the component errors were based on the conclusions drawn from various evaluation studies and used in a model for total error. A simulation method then produced an estimate of the bias and variance of the estimated undercount rate.

A variance component incorporated the error component due to missing data. The bias of the estimated undercount rate under the PES imputation model was computed to see the effect of combining the imputation for missing data with other sources of error. The undercount-rate bias was also computed under several other imputation models. The staff combined the bias and variance components to produce confidence intervals for the undercount rate and estimate the nonsampling bias and the total variance for the 13 evaluation poststrata (see app. 11A, PREM 165).

The U.S. General Accounting Office (GAO) issued its own evaluation, *1990 Census Adjustment: Estimating Census Accuracy—A Complex Task*, GAO/GGD-91-42, in March 1991, several months before the PES results were due. This report dealt not only with coverage-improvement efforts in the 1988 census dress rehearsal and its PES, but also the 1990 PES itself and, briefly, the Housing-Unit Coverage Study (HUCS; see p. 34). The GAO expressed concern that a number of the major 1990 PES procedures had not been tested before, and that some shortcuts taken to meet the July 15, 1991, time schedule posed major risks to PES quality. The GAO agreed, however, that the PES work would have future value in improving census procedures and possible adjustment activities.

**Results**—In 1993, the PES staff announced the following percentages for the net undercount in the 1990 census calculated in the PES:

|                                |     |
|--------------------------------|-----|
| National undercount (over all) | 1.6 |
| Non-Black                      | 1.2 |
| Black                          | 4.4 |
| Hispanic (may be any race)     | 5.0 |
| Asian/Pacific Islander         | 2.3 |
| American Indian/Alaska Native  | 5.2 |

**Staffing and costs**—At the peak of PES operations, staffing for clerks for various tasks ranged from 200 (address listing book processing) to close to 800 (mover matching) and for PES interviewers, 3,300. The actual PES project, including direct and indirect field, processing, and headquarters salaries and expenses, cost approximately \$37.9 million during fiscal years (FY's) 1989 through 1993. With related projects, such as demographic analysis (DA—about \$3.78 million; see p. 30), the overall cost of the 1990 PES was approximately \$55.2 million. (See app. A elsewhere in this history.)

### Characteristics of Census Error

Census coverage error can occur during many phases of data collection and processing. In attempting to improve the decennial census, the Census Bureau made an effort to identify these errors and their corresponding characteristics.

There are two general categories of coverage errors—erroneous enumerations (persons enumerated in error) and omissions (persons not enumerated). Data collected from the PES and the HUCS provided the framework for an analysis of these errors in the 1990 census. Erroneous enumerations included duplication, persons counted in the wrong geography or at the wrong address, fictitious persons, and all others erroneously enumerated. The enumeration errors identified in the PES were examined (along with census files and questionnaires) to determine where and why rates varied. All differences between PES data and census data were assumed to have been “census error.”

Data linked from PES files, census files, and files created from a clerical review of census questionnaires

were tabulated to produce estimates of erroneous enumeration (EE) rates for specific characteristics. Standard errors were used to produce confidence intervals and conduct hypothesis tests. All hypothesis testing was done at a significance level of 10 percent.

It was estimated with 90-percent confidence that between 4.3 and 4.8 percent of the persons enumerated in the census were enumerated in error. Four types of errors were defined, with the following estimated EE rates:

|                 |     |
|-----------------|-----|
| Duplicates      | 1.7 |
| Fictitious      | 0.2 |
| Geocoding error | 0.4 |
| Other           | 2.4 |

Duplication errors could have resulted from delivery errors by the Bureau. Errors of this nature might occur when a household received and completed more than one questionnaire or completed a questionnaire and was subsequently visited by an enumerator. “Other” errors could have been a result of a respondent misunderstanding the census residence rules and including people erroneously on the form. Duplication and “other” errors comprised the majority of all errors.

**Mail returns**—The differences between questionnaires completed and returned to the Census Bureau by mail and questionnaires filled out by enumerators were integral in the search for characteristics of census error. Most mail-returned questionnaires were completed by household members, but occasionally a proxy completed the form. The DSSD study identified that about 73.9 percent of all persons were enumerated by the mail-return method, and estimated with 90 percent confidence that between 2.9 and 3.3 percent of these persons were erroneously enumerated.

These errors were distributed across the four category error spectrum. Duplication accounted for 32.5 percent of the total erroneous enumerations on mail returns. Persons enumerated at one address who should have been counted at another or not counted at all (“other errors”) made up approximately 54.1 percent of these errors. Fictitious persons made up about 1.7 percent of the errors, while persons enumerated correctly but with their addresses incorrectly geocoded constituted around 11.8 percent of the total. Error rates further varied by characteristics, and analysis of the data produced some interesting findings:

- Approximately 99.7 percent of all mail return forms were completed by a household member. A proxy completed about 0.3 percent of the questionnaires. Questionnaires filled out by a household member had an erroneous enumeration rate of 3.0 percent, while forms completed by a proxy had an error rate of 7.0 percent. It was not unexpected to find that proxies were less knowledgeable than household members. The figures suggested that household members should complete the questionnaire whenever possible.



- Mail-return erroneous enumeration rates broken down by race/ethnicity:

|                   |             |
|-------------------|-------------|
| Total             | 3.1 percent |
| Black             | 4.0 percent |
| Nonblack Hispanic | 3.5 percent |
| All Other         | 3.0 percent |

The only significant difference in this category was between the 4.0 percent for Blacks and 3.0 percent for All Others (10 percent significance level).

- Length of form, sex, and age appeared to have no bearing on the erroneous enumeration rates.
- The error rate increased over time. Forms completed between March 18th and March 24th had an error rate of 2.4 percent, while questionnaires received between the 8th and 14th of April had an error rate of 5.3 percent. The rise in the rate of error could be attributed to many factors. If a household moved in after April 1 and still completed a census form, it would be erroneously enumerated. Also householders who were most conscientious about mailing the form quickly may have been the most conscientious about completing the form accurately. Although this increase in error was significant, only 2.3 percent of mail returns were from this late time frame.
- The size of the household produced little significant data, although larger households (5,6,7,8+ members) had a slightly higher rate of error than smaller households (3.7 percent versus 2.9 percent). Households of size 8 or more had a higher rate of error (5.8 percent) than all other households (3.1 percent).
- Persons who live in single-unit structures had a rate of error of 2.8 percent; whereas, persons who live in multiunit structures had a 4.0 percent rate of error. This error rate discrepancy could be due to (a) the greater likelihood of delivery errors in multiunit structures or to (b) persons living in multiunit structures, not the structures themselves.
- Renters had a higher rate of error than persons who owned their units (3.9 percent versus 2.8 percent). This again could be more a factor of the characteristics of the renter population.

**Enumerator completed**—During followup, enumerators completing questionnaires could make many mistakes that would lead to erroneous enumeration. An enumerator may have counted persons who moved into the unit after April 1 (Census Day), enumerated the wrong household in a multiunit structure, fabricated data, or biased responses by rewording questions. A respondent could also supply the enumerator with faulty information. DSSD estimated with 90 percent confidence that between 8.2 and 9.2 percent of the persons cited on enumerator-completed questionnaires were enumerated in error.

Enumerator-completed errors, like mail-return errors, consisted primarily of duplication and “other” errors. Duplication accounted for 40.2 percent of the total erroneous

enumerations. “Other errors” totaled 49.9 percent of the sum, while fictitious persons (5.4 percent) and geocoding errors (4.6 percent) made up the rest.

Analysis of the data summarizing the enumerator-completed erroneous enumeration rates by characteristics revealed that:

- “Last resort and closeout” procedures allowed enumerators to turn in questionnaires with some items unanswered. Predictably these questionnaires had a higher error rate (12.8 percent) than regular enumerator-completed forms (8.4 percent).
- For enumerator returns, race/ethnicity was not a strong factor in the occurrence of erroneous enumerations. Enumerator-return erroneous enumeration rates broken down by race/ethnicity:

|                   |             |
|-------------------|-------------|
| Total             | 8.7 percent |
| Black             | 9.4 percent |
| Nonblack Hispanic | 9.1 percent |
| All Other         | 8.5 percent |

There are no significant differences between the erroneous enumeration rates of any of these race/ethnicity groups (10 percent level of significance).

- When enumerators interviewed household members, the error rate was 7.7 percent. However, the error rate jumped to 13.4 percent when enumerators had to speak with a proxy to complete the form.
- Length of the form had no bearing on mail-return error rates but did influence enumerator-completed error rates. Persons enumerated with a short form had an error rate of 9.3 percent while long-form questionnaires had an error rate of 6.5 percent. These figures could be the result of enumerators using the short form for cases that were difficult to enumerate and the use of short forms on nearly all last resort and closeout questionnaires.
- Just as with mail-return error rates, these error rates increased with the length of time it took to complete the enumeration process. Weekly error rates rose from 3.1 percent to 18.4 percent between April 15 and July 7. The time periods with the highest rates of error, however, had relatively low frequency.
- The size of the household appeared to somewhat influence error rates as one person households were more likely to be enumerated in error (10.6 percent versus 8.5 percent). Reasons for this finding included the fact that enumerators might have had an easier time contacting larger households or perhaps fabricated small households they could not locate.
- Persons enumerated in multiunit structures were more likely to be enumerated in error (9.7 percent) than those who lived in single units (7.5 percent).
- Renters had a higher rate of erroneous enumeration (9.6 percent) than owners (7.8 percent).

**Comparing erroneous enumeration rates**—Mail-return EE rates were much lower than enumerator-completed EE rates (3.1 versus 8.7 percent). Self response, therefore, appeared to be the desired mode of enumeration for obtaining the most accurate data. However, the high rate of error for enumerator-completed forms was probably less the result of the enumerators than the result of the characteristics of the persons and housing units enumerated during followup. In either case, the earlier the data were collected, the more likely quality data were obtained. The following is a comparison of the error rates by the type of error:

- "Other" errors had the highest error rate for both methods of data collection. Enumerator-completed forms had a higher rate of "other" errors (4.3 percent) than mail-return forms (1.7 percent), but "other" errors comprised 49.9 percent of all enumerator-filled errors and 54.1 percent of mail-return errors.
- There was no significant difference in the percentage of geocoding errors between mail-returned and enumerator-completed forms.
- Fictitious persons were more likely to be found on enumerator-completed forms than mail-returned questionnaires (0.5 percent versus 0.05 percent).
- Duplicates occurred less frequently on mail returns (1.0 percent) than on enumerator-filled questionnaires (3.5 percent). These errors constituted 40.2 percent of all enumerator-filled form errors, and 32.5 percent of all mail-return errors (see app. 11A, PREM's 179 and 240).

### **Analysis of Census Omissions**

The purpose of the analysis was to search for factors that might have been related to the omission of persons from the 1990 census. The PES, designed to measure the net coverage of the population in the 1990 census, did not provide a direct estimate of census omissions. This study was based on P-sample nonmatches. Although one reason for a P-sample nonmatch was a census omission, there were other possible explanations. Neither were all P-sample nonmatches omissions nor were all omissions P-sample nonmatches. All hypothesis tests were performed at a confidence level of 10 percent. (For details on the analysis of census omissions, see PREM's 251 and 273.)

Overall, the weighted estimates from the PES P-sample had a 7.8 percent nonmatch rate. For nonmovers in the PES P-sample, the weighted estimates had a 6.2 percent nonmatch rate. For in-movers and no status persons, the weighted estimates had 24.8 and 29.7 percent nonmatch rate, respectively. It was noted that 73.5 percent of the nonmatches were nonmovers, 25.0 percent of the nonmatches were in-movers, and 1.5 percent of the nonmatches were "no status" cases. This contrasted with 91.8, 7.8, and 0.4 percent of total P-sample persons being nonmovers, in-movers, and "no status" cases, respectively.

Comparison of these results made it clear that the distribution of nonmatches was very different by P-sample final status classification. In-movers and no status cases had much higher nonmatch rates than nonmovers. This could be an indication of higher omission rates for these two groups and/or problems with PES attempts to match these persons to the census.

Limiting the analysis to occupied units, important differences were observed in nonmatch rates by census procedures, such as method of enumeration (mail versus personal visit) and regular personal visit enumeration versus last resort/closeout enumeration. The nonmatch rate was 1.3 percent for persons in housing units enumerated by mail and 5.0 percent for persons in housing units enumerated by a personal visit. Last resort and closeout households had a nonmatch rate of 18.5 percent. The nonmatch rates by enumeration date suggested that fewer persons were missed in the earliest stages of data collection (see app. 11A, PREM 251).

### **Categorical Data Analysis of Census Omission**

This study was an extension of the census omission study described above. This study examined analytically the joint effects of multiple factors on the omission of persons from the 1990 census through use of categorical data analysis. The data for this study came from the PES cluster review (PCR) vintage P-sample file that was created in April 1992. This study was based on the P-sample nonmovers. The P-sample movers and the P-sample persons with no status were excluded from the study under an assumption that the mechanism of census omissions among them was inherently different from the mechanism of census omissions among the P-sample nonmovers. The distribution of the P-sample persons by the P-sample final status showed that the P-sample nonmovers accounted for 92 percent of all P-sample persons, weighted. This study did not link the P-sample to the E-sample. One advantage of not linking the P- and E-samples was to retain as many nonmatches as possible. There were 25,623 unweighted P-sample nonmatches in this study. One drawback of not linking the P- and E-samples was that it precluded the possibility of examining the effects of factors on census housing units present only in the E-sample (such as vacant housing units and mail versus enumerator returns) on census omissions (see PREM 273).

Data from the 1990 PES were analyzed using loglinear models to determine which explanatory variables best predicted the census omissions. Fourteen explanatory variables were examined and they were all found to have important roles in predicting census omissions. However, the relation variable, which identified the relationship of each individual in a housing unit to the householder, played the most prominent role in predicting census omissions. The study showed that the probability of a "nonrelated" person being missed in the census was high, especially if the person lived in a housing unit with four or more persons or if the person lived in an "other" type of structure, such as



a mobile home, trailer, etc. The miss probability among nonrelated persons was high at all levels of the tenure variable (see PREM 273).

## Error Study

This study examined the impact of the address list development and questionnaire delivery activities on over-coverage in the 1990 census. The goal of the address list development program was to update and improve the address lists of the persons to be enumerated by the census. Erroneous enumerations recorded in the 1990 post-enumeration survey (see p. 19) were the basis for these analyses.

The Census Bureau attempted to improve accuracy and completeness of the ACF address list prior to the 1990 census through a series of coverage improvement techniques (CIT program). Results of the CIT program were entered in the ACF through the ACF processes of updating and maintenance.

The data on the coverage improvement operations came from an examination of the final census files, the ACF, the identification file (IDF), and the data capture file (DCF). The coverage improvement data were linked with the E-sample person file from the post-enumeration survey. The E-sample file classified each person as either correctly or erroneously enumerated in the census. The error study excluded those E-sample persons who were enumerated in group quarters, persons with an imputed probability of correct enumeration, and persons with insufficient information for matching.

The data analysis was conducted separately for each type of enumeration area (TEA). However, list/enumerate areas could not be analyzed because no coverage improvement operations were done in these areas. Therefore, only TAR, prelist, and update/leave areas were included in the error study.

The study's dependent (response) variables were the final PES E-sample enumeration status (correct or erroneous enumeration) and the independent (explanatory) variables were the data from the coverage improvement operations. A loglinear model to describe association patterns among the variables was chosen and CPLX computer software, developed by Robert Fay of the Bureau, was used to analyze the data.

**TAR areas**—TAR area parameter estimates implied the importance of the tenure variable (owner/renter) in predicting erroneous enumerations. Data revealed that when a person's tenure was unknown, the person was more likely to be erroneously enumerated. Further examination also uncovered that persons whose addresses were considered unmailable at the time the initial label tapes were created were more likely to be erroneously enumerated and post master returns were more likely to be erroneously enumerated than those whose addresses were not post master returns. A strong correlation was noted between the NRFU

variable and the dependent variable. If a housing unit (HU) was not sent to NRFU, the persons in the unit were more likely to be correctly enumerated than if the unit had been sent to NRFU.

**Prelist areas**—The data from these areas also demonstrated a strong correlation between mailability, post master returns and erroneous enumeration rates. Those whose addresses were identified as unmailable or as post master returns were more likely to be erroneously enumerated. A three-way interaction involving variables EE, tenure, and PMR was also measured in prelist areas. Analysis revealed that those addresses added to the ACF after prelisting were also more likely to be erroneously enumerated. After controlling for other variables, owners and nonowners did not significantly differ in their EE rates.

**Update/leave areas**—In these areas the NRFU variable analysis indicated that if a HU was sent to NRFU the persons in that HU were more likely to be erroneously enumerated, and if a HU was not sent to NRFU, persons living there were more likely to be correctly enumerated. Similar to prelist areas, unknown tenure status translated to likely erroneous enumeration, while there was no significant statistical difference between the EE rates of owners versus renters. The persons whose HU's were added to the ACF as a result of later operations (such as NRFU, field followup, postcensus local review, and search/match) were also more likely to be erroneously enumerated.

Evaluation of the TEA's revealed similarities amongst the three areas. Persons living in HU's which were added in the prelist operation were more likely to be enumerated correctly than persons who lived in units added after prelist. Also in each TEA, those persons living in units that were flagged as deletes during NRFU or field followup (FFU) were more likely to be erroneously enumerated than those who lived in units that were not sent to NRFU or FFU. If the tenure was unknown, an EE was more likely than if tenure was known (see PREM's 248 and 267).

## Evaluations of Census Coverage Estimates

Evaluations of census coverage estimates were completed using data from the PES evaluations. The difference between the PES estimate and the estimated error-free count was referred to as the total error.<sup>20</sup> The DSE was subject to many sampling and nonsampling errors. These components of error were response correlation bias (also called model bias), matching error, quality of reported Census Day address, fabrication in the P-sample, processing error in the E-sample, data collection error in the E-sample, error in balancing the estimates of the gross overcount and the gross undercount, missing data (imputation error), sampling variance, and ratio estimator bias. A synthesis of the error components provided estimates of bias and variance of the PES estimates.

<sup>20</sup>Total error was composed of model error, arising from failure of basic assumptions underlying dual system estimation, and measurement error. (Total error = model error + measurement error)

## Components of PES Error

**Model error**—Model bias (or correlation bias) is the bias in the DSE due to the failure of the independence assumption. There are three independence assumptions made for the dual system estimator; casuality, homogeneity, and autonomy. Casuality refers to the element that likelihood of being included in the census is independent of the likelihood of being included in the PES. Homogeneity means that the capture probabilities within each post strata were identical for the census and the PES. Autonomy alludes to the concept that the census and the PES were both created as a result of mutually independent trials.

Model bias was measured by comparing the PES estimates of population size with an independent estimate from demographic analysis (DA). (For more detail on the DA operation, see p. 30) Although DA may have been subject to its own set of errors, the use of sex ratios, as opposed to the estimates of population size themselves, probably minimizes the effect of such errors. Four estimators of model bias were developed employing the DA sex ratios. Each method assumed no model bias for females which was equivalent to assuming independence of inclusion in the PES and the census. However, each technique assumed a different parameter for males was constant across PES post strata within an age-race group.

**Matching error**—These errors occurred in the operation where the P-sample was matched to the original enumeration. Matching errors didn't encompass response errors that arose in the data collection. Following P-sample interviewing, a search of the census was conducted to determine if the respondents were enumerated. Errors which occurred, in either direction, during the processing of the data were known as matching error. People designated as matching a census enumeration when they were not in the census, were identified as "false matches." Those designated as not enumerated, though they actually were, were called "false nonmatches."

Estimates of P-sample matching error were based on the results of a re-match (matching error study), completed by the highest skilled personnel without any pressure from a production schedule. Cases were reviewed in block clusters and assigned new codes. Weighted data from the matching error study was used to estimate the expected matching error value.

**Error in Reported Census Day Address**—Some P-sample respondents moved between Census Day and their PES interview. Their address may have been misreported for a couple of reasons; they may not have reported their previous address accurately, or their previous address could have been geocoded incorrectly. Either of these errors would have led to the assignment of a nonmatch status, when the respondent actually had been enumerated in the census. Misassignment of the status of nonmatch would cause the estimate of the number of people missed by the census to be biased upward.

Measurement of the error in the reported census day address was based on data collected in the P-sample portion of the evaluation followup. The sample consisted of the whole household and partial household nonmatches in the 920 block clusters selected for evaluation. A control group of whole household and partial household matches was included in the sample. The sample also included both movers and nonmovers. Nonmatched and matched cases that had not been to production PES followup were given the PES followup forms, while cases that were to PES followup were given specially designed, probing revisit questionnaires. The evaluation interviews were conducted by only experienced, trained permanent personnel, in contrast to census and PES interviewers who were primarily temporary employees. Weighted data from the evaluation followup of P-sample cases was utilized to create the estimates of reported census day address error.

**Fabrication in the P-sample**—Fabrication of people in P-sample housing units may have resulted in the estimate of coverage error based on the dual system estimator to be too large. Research has found that interviewer fabrications have traditionally been found in the form of inventing whole households. A household member was rarely fabricated when other members of the household were real residents.

The quality control operation for the interviewing phase of the P-sample was designed to check for fabricated interviews and to interview the real household members. Therefore, no statistical correction for fabrication in the P-sample was made in the formation of the dual system estimates. Estimating the amount of error due to fabrication in the P-sample was completed using data from the evaluation followup.

**E-sample office processing error**—This component is caused by errors in measuring census error. An error in the estimation of the number of erroneous enumerations occurred either when an enumeration in the E-sample was designated as erroneous even though it was correct, or correct although it was actually erroneous. Thus both positive and negative error could occur as a result of erroneous enumerations. The types of errors that were most vulnerable to misclassification were duplication and fabrication.

The matching error study, previously referred to in the matching error section, also measured E-sample office processing error and data from that study was used to estimate amount of processing error.

**Error in E-sample data collection**—During E-sample followup, enumerations which did not match P-sample people were sent to the field so that more information could be collected. Enumerations were subsequently labeled correct, erroneous, or unresolved. Errors in respondent answers, the administration of the questionnaire, or the recording of respondent answers led to mistakes in the designation of enumerations as correct or erroneous. Error in E-sample data collection could have led to either positive or negative error.

Weighted data from the 920 evaluation followup E-sample block clusters was used to estimate the expected value of E-sample error.

**Missing data**—Both the E-sample and the P-sample had missing data. These were unresolved cases where information needed to determine whether the person was enumerated in the census was not available. Unresolved status occurred in more than one way. The interviewer may have been unable to obtain an interview during the P-sample interviewing or during the PES followup. A P- or E-sample questionnaire may not have had all the demographic and housing information required for the estimation. Even with all the information requested on the questionnaire, the circumstances may have still been so unclear that the enumeration status could not be resolved.

Net error in the DSE attributable to imperfect compensation for missing data was assessed using data from alternative imputation models. Eight alternative models, including the preferred model used in production PES, were examined to evaluate the missing data. One method treated any proxy interview (P-sample or E-sample) as a noninterview. Another method incorporated a logistic regression model, similar though not identical to that used in production PES. The remaining alternatives were combinations of these methods.

Error due to missing data estimated as a random error follows:

$$V_M = V_{RA} + V_B + V_I$$

$V_{RA}$  = the variance due to the model selection

$V_B$  = the variance due to the model parameter estimation

$V_I$  = the within person imputation variance

Estimates of each of the model variances was determined through a series of equations.

**Sampling error**—The observed DSE was subject to sampling error because it was based on a sample. The sampling error was affected by the estimator and the sampling design. The PES P-sample and E-sample observations were collected from the same sample of blocks. The estimation of the sampling error took into account the tendency for census misses and erroneous enumerations to be correlated within blocks and within housing units. The variance for the DSE was estimated using the entire PES sample and a variance estimation program which used a replication method.

**Ratio estimator bias**—The DSE is a ratio and thus subject to the bias of a ratio estimator. The bias was estimated using the complete PES sample and a variance estimated by an assumed coefficient of variation for the estimate of the ratio estimator bias of 0.10.

## Results

There were 13 poststrata independently examined in the evaluation of the PES estimates. The sources of error were synthesized into a description of their overall effect on the

13 poststrata PES estimates of census undercount. The synthesis was in the form of a 95 percent interval for net undercount rate. Whether the confidence intervals cover zero was one method of evaluating the accuracy of the undercount estimates.

| Evaluation Poststratum                                    | Net undercount rate | 95% interval  |
|---|---------------------|---------------|
| 1. Northeast, Central City, Minority . . . . .            | 6.83                | (2.48, 11.68) |
| 2. Northeast, Central City, Nonminority . . . . .         | -0.75               | (-3.06, 0.38) |
| 3. U.S., Noncentral City, Minority . . . . .              | 5.43                | (2.27, 6.75)  |
| 4. Northeast, Noncentral City, Minority . . . . .         | 0.01                | (-2.85, 0.80) |
| 5. South, Central City, Minority . . . . .                | 5.68                | (0.89, 6.65)  |
| 6. South, Central City, Nonminority . . . . .             | 1.94                | (-1.08, 3.36) |
| 7. South, Noncentral City, Nonminority . . . . .          | 1.82                | (0.19, 3.37)  |
| 8. Midwest, Central City, Minority . . . . .              | 3.97                | (2.46, 7.61)  |
| 9. Midwest, Central City, Nonminority . . . . .           | 1.28                | (-1.14, 2.45) |
| 10. Midwest, Noncentral City, Nonminority . . . . .       | 0.39                | (-1.41, 1.16) |
| 11. West, Central City, Minority . . . . .                | 6.14                | (3.54, 9.22)  |
| 12. West, Central City, Nonminority . . . . .             | 2.13                | (0.33, 7.66)  |
| 13. West, Noncentral City, Nonminority + Indian . . . . . | 1.84                | (-0.96, 2.33) |
| National . . . . .  | 2.11                | (1.00, 2.25)  |

The total error of the net undercount rates for census divisions was also examined.

| Division code                  | Net undercount rate | 95% Interval   |
|--------------------------------|---------------------|----------------|
| 1 New England . . . . .        | 0.72                | (-2.37, 1.25)  |
| 2 Middle Atlantic . . . . .    | 1.26                | (-1.76, 2.06)  |
| 3 South Atlantic . . . . .     | 3.52                | ( 1.45, 4.52)  |
| 4 East South Central . . . . . | 1.26                | (-4.07, 2.14)  |
| 5 West South Central . . . . . | 2.14                | ( 1.23, 4.41)  |
| 6 East North Central . . . . . | 0.94                | (-1.06, 1.74)  |
| 7 West North Central . . . . . | 1.34                | (-0.03, 2.52)  |
| 8 Mountain . . . . .           | 2.56                | (-2.42, 5.60)  |
| 9 Pacific . . . . .            | 3.43                | ( 1.85, 4.04)  |
| 0 Indians . . . . .            | 12.72               | ( 3.42, 22.68) |

In the analysis of total error, some trends were revealed. In all but two post strata, net "matching error" was negative which caused the undercount rate and DSE to be overestimated. "Census day address error" caused an upward bias in the DSE and net undercount in all poststrata but one. "P-sample fabrication" was only measured in three of the components of error, but in all three cases an upward bias in the net undercount rate was found. "E-sample office processing error" generally led to an overestimate of the DSE and net undercount rate while, "E-sample data collection error" led to a national underestimation of the DSE and net undercount rate. An upward bias was found in all poststrata as a result of "ratio estimator bias," whereas "model bias" led to an underestimate of the DSE and the undercount rate in strata where bias could be determined. "Sampling error" was the major source of error in all but one of the evaluation poststrata and could thus be considered the number one source of error (see PREM 165).

## Demographic Analysis (DA)

DA is a method, widely used by demographers, to develop population estimates and projections, and in the

Census Bureau, estimates of census coverage as well. For coverage evaluation, the demographic estimates were developed from historical sets of aggregate administrative records which were essentially independent of the census. These data sets included birth, death, and immigration statistics, emigration estimates, and Medicare data.

Staff, mainly in the Bureau's Population Division, undertook a DA evaluation program to measure the completeness of coverage in the 1990 Decennial Census and assess the accuracy of the post-enumeration survey. They based their demographic estimates of census coverage by comparing the 1990 census counts with independently obtained estimates of the total resident population of the United States. Those independent estimates were based on an equation using basic demographic data and vital statistics: estimated population = (births - deaths) + (immigration - emigration). The staff examined many sources to verify these. For example, birth and death records came from State and local registration systems (with totals adjusted for underregistration), and official immigration data, from the U.S. Immigration and Naturalization Service (INS). Analysts estimated base populations by extending previous population estimates (based on the decennial censuses). They examined (and adjusted) medicare rolls and used indirect analytic techniques to estimate emigration and illegal (undocumented) immigration.

**Data components**—Some of the largest DA components (births, deaths, alien immigrants, and medicare) were based on administratively produced data and could be prepared in a straightforward manner. For 1990, the staff focused on improving data on two particular components of population change that had been extremely difficult to measure, especially in the 1980's; these were emigration from the United States and undocumented immigration. The following paragraphs briefly describe DA components where there were changes from 1980 in methods, sources, or quality of data (see PREM 104).

**Births** were by far the largest component of population change; thus even relatively small errors in the estimates of births affected demographic estimates of coverage. The principal source of error in the birth estimates lay in the factors used to adjust for underregistration. It was assumed that the registration-completeness factors based on the 1940, 1950, and 1964-68 birth registration tests were correct; any biases in the test results would directly affect the coverage estimates. In producing the demographic estimates of population for 1990, the staff revised the estimates for Black cohorts born between 1925 and 1950 to account for biases that recent research had found in the 1940 test results (and by interpolation to all other years between 1935 and 1980 or 1990). Also, the birth corrections for 1990 had to be based on a 22-year extrapolation of the 1964-68 test, as there was no more recent test of registration to validate the assumption that registration completeness remained the same over those 22 years.

In the models used to arrive at confidence-interval estimates, the staff incorporated values that reflected the

possible range of errors in the corrected births due to possible biases. The estimated error in the birth component accounted for 39 percent of the total variance in the estimated population and percent undercount. For Blacks, the birth component contributed 75 percent of the overall variance in 1980. (For evaluation and quantification of four specific sources of error in the estimates of birth registration completeness, 1935 to 1990 matching bias, correlation bias, interpolation/extrapolation bias, and sampling variance, see PREM 74.)

The birth data for race groups were subject to an additional component of error, in that there was inconsistency in the race of births as reported in vital statistics and the race reported in the census (primarily involving mixed-race marriages). Specifically, the inconsistency of the race classification of the undercount-rate numerator (the census) with the race classification of the denominator (based on birth statistics) created a "classification error" in the estimates of coverage for race groups (although this did not affect the coverage estimates for the total population). Tabulations from the National Center for Health Statistics (NCHS) showed the growing significance of this inconsistency for recent birth cohorts of non-White race groups. The DA staff incorporated the effect of this classification error in the high and low multipliers for the birth component. (The models used here and with some of the other components to assess errors in the undercount rates are described in PREM 84; the inconsistencies in race classifications are discussed in PREM 82.)

**Undocumented aliens** constituted one of the most problematic components in the DA estimates. Even given the staff's progress in accounting for them since the initial 1980 undercount estimates, the estimates for this population were still susceptible to large errors that made "point" estimates of coverage uncertain, especially for the non-Black population. For 1990, the staff assumed their number to 3.3 million, based principally on analysis of data on the foreign born from periodic supplements to the Current Population Survey (CPS) to estimate growth in the undocumented population. This analysis involved a residual-estimation technique where an estimate of the 1980 legally resident foreign-born population was carried forward to the survey date and compared with the foreign-born population figures in the CPS; the difference was assumed to represent undocumented aliens included in the CPS. The staff extended this technique to estimate the number of undocumented aliens included in the 1990 census. As for 1980, they modified this estimate on the basis of (a) assumptions about this group's coverage and (b) other available research to represent the total undocumented resident population.

The method for using the CPS and the method for the 1980 census to arrive at an independent estimate for the legally resident foreign-born population differed because the major data source for 1980, the INS's annual alien-registration system (known as I-53), which would have revealed departures, had been discontinued. The alternative techniques in the CPS-based studies were based on many assumptions, especially as to emigration of legal

immigrants, but the staff was able to find new, accurate data on the legalization of formerly undocumented residents during recent years. Nevertheless, the uncertainty in estimates of undocumented residents led to a relatively large variance for this component, 17 percent of the total variance and mainly applicable to the non-Black population. Uncertainty in the estimates of undocumented immigration of non-Black males accounted for almost 21 percent of the total variance. These results were similar to those found in evaluating the 1980 census. (For further discussion of methodology here, see PREM 75.)

**Emigration** was the third largest contributor to the overall error in the demographic estimates for 1990, 15 percent of the total variance. This component was important for several reasons: First, unlike the 1960's and 1970's, where the emigration estimates had some empirical basis, contemporary estimates for the 1980's represented simple (and error-prone) extrapolations of pre-1980 trends. Although there was research in the late 1980's that explored measuring emigration from multiplicity-based surveys, that approach had not yet been validated. Thus, the staff continued to extrapolate, and for the 1990 estimate assumed emigration to be 160,000 a year. Second, this component was of increased importance because foreign-born emigration was one of the components used in the only available method (for 1990) to derive estimates of undocumented aliens. (These were residual estimates, based on comparing the legally resident foreign-born population (carried forward from 1980 with change including emigration) to the CPS or census estimates of the total foreign-born population.) Thus, errors in the estimates of foreign-born emigration would contribute directly to errors in the estimates of undocumented immigrants (although the errors in these two components would be offset in their effect on the estimates of the total population). The staff concluded that the emigration estimates for the 1980's might have been subject to greater error than assumed, and therefore have a direct bearing on the accuracy of other components. (For further discussion, see PREM 78.)

**Legal alien immigration** constituted the largest immigration component—aliens admitted for permanent residence in the United States. The estimates here were based on INS administrative records believed to be quite complete and timely. The race of these immigrants had to be estimated, however, based on the race of recent immigrants from the same countries of origin as reported in the most recent census (in this case, from the 1990 census sample data that were not available until early 1992). The staff estimated that uncertainty in the alien-immigration component contributed about 12 percent of the overall uncertainty in the demographic estimate of population, principally because of the magnitude of legal immigration rather than the range of the multipliers.

**Medicare data** from administrative records on aggregate enrollments were used to estimate the coverage of the population aged 65 and over. Although Medicare enrollment generally was presumed to be quite complete, the basic data had to be adjusted to account for groups known

(or suspected to be) omitted. These were persons eligible but not enrolled, aliens living in the country for less than 5 years, and certain Federal employees and annuitants. These adjustments for underenrollment, based on survey estimates and cohort analysis, amounted to 3.2 percent of the total 65-and-over population in 1990. The estimated variance in the Medicare-based estimate of this population accounted for about 9 percent of the total variance in the estimated population and undercount rate. The variance attributable to the Medicare component was relatively large for non-Black females (attributed in part to their older-age structure) and small for Black males and females. (For a discussion of the robustness of the estimates of the 65-and-over population, see PREM 79.)

**Base populations** for ages 55 to 64 in 1990 were more difficult to estimate than other groups. The absence of national data on registered births and underregistration factors for this group (that is, births from 1925 to 1934) made it necessary to use other sources and methods. The staff based their estimates of population coverage in 1990 for this age group on "indirect" methods. They estimated the number of Whites from an outside estimate for the period, carried forward to 1940 with life-table survival rates and to subsequent census dates with components of change. They based estimates of the Black population in 1990 on revisions to outside estimates of that cohort in 1980 (i.e., when it was 45 to 54 years old) derived principally from stable-population analysis in 1973 and subsequently revised further when research revealed that the 1973 estimates tended to overstate the size of Black cohorts born between 1920 and 1950. The staff derived estimates of the Other Race population aged 55 to 64 from assumptions about the consistency of age patterns of coverage in earlier censuses and by using expected sex ratios. The many assumptions concerning this age group led to wide multiplier values and variance in the undercount estimates. According to the model used to estimate error intervals for 1990, the potential error in the base populations alone contributed about 2 percent of the total variance for the Black population and 3 percent for non-Blacks for 1990. The assumed interactions of errors in the base-population estimates with births and with the Medicare estimates contributed another 8 or 9 percent to the overall uncertainty for Blacks and 13 to 14 percent for non-Blacks. The variance in the base population for 1990 (55 to 64) was of lesser overall importance than in the 1980 coverage estimates, where both the 45-to-54 and the 55-to-64 had to be estimated with indirect methods. (For an analysis of the uncertainty in estimating White and Black births for 1915 to 1934, see PREM's 76 and 77, respectively.)

**Other components**—Deaths, net Puerto Rican migration, net civilian migration, U.S. Armed Forces overseas, and foreign students were estimated to contribute only a small amount of the overall variance. The death component was based on administrative records believed to be relatively complete. Puerto Rican migration estimates were based on the movement of passengers as reported by the Puerto



Rico Planning Board, but subject to revision once 1990 census sample data on place of birth became available. The staff estimated the net arrival of civilians based on Defense and State Department reports concerning Armed Forces dependents and Federal employees and their dependents, respectively); their age, sex, and race characteristics had to be estimated. The Department of Defense provided timely data for all characteristics of the Armed Forces overseas. Data on foreign students came from the INS and the Institute of International Education, with race distributions estimated on the basis of country of origin. The staff concluded that relative to the rest, most of the "other" components were so small that even large errors in them would have had a negligible effect on the total variance. (For further discussion, see PREM 80.)

**Population characteristics**—In addition to estimating the total U.S. population in 1990, DA also generated estimates of its sex, age, and racial composition. However, before the sizes of the various racial groups could be estimated, the census data needed to be modified to make the race categories consistent with those in the DA: In the 1990 census, approximately 9.8 million people identified themselves as "Other race-not specified." That category was not included in demographic data and thus nearly 10 million people had to be racially classified based on calculated estimates, usually by throwing "Other race" into the "White" category, as had been done for the 1980 DA. (See PREM 89.) Further, age categories in the census were adjusted so they would be consistent with the April 1, 1990, time reference in the demographic estimates. (For a discussion of models dealing with the reclassification of racial data, see PREM 81.)

The DA total-population number was itself subject to the errors of its components (as described above). The actual total-population figure calculated by DA was referred to as the "point estimate" of the true size. The point estimate then was used to compute a 95-percent error interval for the total population. Error intervals also could be determined for any of the individual demographic variables (race, sex, and age) and their subsequent undercount rates.

The overall uncertainty of the DA net undercount estimates (for 1990, 1.8 percent nationally, as compared with 1.2 percent for 1980) could be attributed primarily to four sources—births, emigration, and either undocumented or legal immigration. These four elements accounted for 83 percent of the variance measured by the error model that used a 95-percent rate. Births represented the highest percentage, 39.2, of overall variance. Other demographic data, such as deaths, medicare, and base population also contributed to overall variance, but to a much lesser extent than the four components previously mentioned. (For a discussion of the differences between preliminary and final estimates of the percent net undercount for 1970 and 1980, and their relationship to 1990, see PREM 83.)

The demographic estimates were much more valid when analyzing differences in coverage than when measuring absolute coverage levels. The staff credited this to the fact that any errors in the estimates were likely to be consistent across all variables and would cancel out in the long-run comparison. Thus, although DA could not precisely estimate undercount levels, many rather distinct statements could be made concerning comparisons and patterns of coverage.

**Results**—DA revealed the total-population point estimate for 1990 at 253.39 million. The undercount estimate for the 1990 census therefore was 4.68 million (1.85 percent). The estimated undercount for males exceeded the undercount for females at a rate of nearly 3 to 1 (3.48 million vs. 1.20 million). The undercount rate for Blacks was also much higher than the rate for non-Blacks (5.68 percent vs. 1.29 percent). Black males were estimated to have been omitted by the census at the highest rate, 8.49 percent.

DA estimates of the net undercount had been on the decline for all demographic variables since 1940, until the 1990 census. Percent net-undercount rates for the total population had fallen from 5.4 percent in 1940 to 1.2 percent in 1980; the rate for males, from 5.8 to 2.2 percent, and females, from 5.0 to 0.3 percent. In the 1990 census, percent undercount rates were up across the board; however, the gap between the percent undercount of males and females, which had increased every year since 1940, decreased slightly. (See table 4.)

Table 4. Historical Demographic Analysis Estimates of Percent Net Undercount and Differences by Race and Sex: 1940 to 1990\*

| Race/sex               | 1990 | 1980 | 1970 | 1960 | 1950 | 1940 |
|------------------------|------|------|------|------|------|------|
| Total .....            | 1.8  | 1.2  | 2.7  | 3.1  | 4.1  | 5.4  |
| Male .....             | 2.8  | 2.2  | 3.4  | 3.5  | 4.4  | 5.8  |
| Female .....           | 0.9  | 0.3  | 2.0  | 2.7  | 3.8  | 5.0  |
| Black .....            | 5.7  | 4.5  | 6.5  | 6.6  | 7.5  | 8.4  |
| Male .....             | 8.5  | 7.5  | 9.1  | 8.8  | 9.7  | 10.9 |
| Female .....           | 3.0  | 1.7  | 4.0  | 4.4  | 5.4  | 6.0  |
| Non-Black .....        | 1.3  | 0.8  | 2.2  | 2.7  | 3.8  | 5.0  |
| Male .....             | 2.0  | 1.5  | 2.7  | 2.9  | 3.8  | 5.2  |
| Female .....           | 0.6  | 0.1  | 1.7  | 2.4  | 3.7  | 4.9  |
| Difference:            |      |      |      |      |      |      |
| Male: Female .....     | 1.8  | 1.9  | 1.5  | 0.8  | 0.6  | 0.8  |
| Black: Non-Black ..... | 4.4  | 3.7  | 4.3  | 3.9  | 3.6  | 3.4  |

\*Source: PREM 104.

Observing race-sex groups by age revealed that Black males between the ages of 25 and 64 were consistently undercounted at between 10 and 15 percent. In sharp contrast, Black males aged 15 to 19 had a very low rate of net undercount (for this age group, relatively high rates of erroneous enumerations tend to offset omission rates, resulting in the low net undercount rates). Black female net-undercount rates were relatively low throughout the age spectrum with the exception of those aged 0 to 9, who were undercounted for both Black males and females at a high rate.

Non-Black males and females generally were subject to rather consistent, low levels of net undercount. Until the age of 24, non-Black males' and females' net-undercount rates were nearly identical; however, following the age of 24, non-Black males were undercounted at a higher rate than females. Non-Black female net-undercount rates consistently hovered around the zero-undercount line, while there were overcount rates among age groups 15-19, 20-24, 40-44, and 65-69 (see PREM's 84 and 104).

**Evaluating the post-enumeration survey through DA**—As noted above, DA data reflected only data at the national level by age-race-sex, while the PES dealt, through DSE, with subnational geographic areas further stratified by other variables, such as owner vs. renter. The staff found ways to apply national DA to the PES by determining a national "control" total from the DA and assuming several different sets of constants across all tables within PES age-sex-race strata so that the PES dual-system estimates, when aggregated, would agree with the national control total. This method yielded a whole family of estimators corresponding to the different assumptions that could be applied to both the PES and the census. Here, the analysts used sex ratios from DA and assumed independence for females. They compared the resulting undercount rates for males by PES evaluation poststrata with each other and to DSE undercount rates (assuming independence). They also measured correlation bias as an extension of one of the total-error models.

This study found that DA sex ratios for adult ages at the national level for 1990 differed significantly from the ratios calculated in the PES. Comparing DA and PES national population totals suggested that it would be well to assume females' independence of inclusion in the census and the PES (i.e., being included in the census did not necessarily predict inclusion in the PES as well). Consequently, while the differences in sex ratios could be due to a variety of errors in the census, DA, or PES, a leading explanation for adult males in the PES was correlation bias. The study then tried to devise ways to address the correlation-bias problem by defining alternative dual-system estimators for males that were constrained to reproduce the national DA sex ratios for age-race groups. (The analysts did not apply these methods to constrain the DA population totals because they believed those totals to be subject to considerably more error than the DA sex ratios, and using DA totals would transmit such errors directly to the resulting estimators.)

The analysts applied four alternative DSE's, corresponding to four different parametric functions assumed constant over poststrata, to the 1990 PES data. They found that these estimators produced considerably higher undercount rates for Black males age 20 and older, and for non-Black males age 30 and older, than did the DSE assuming independence. The differences between the alternative DSE's generally were smaller than the differences between them and the DSE assuming independence.

The study results had several limitations; among them were the following: The study was limited by the quality of the DA sex ratios. Different assumptions led to different alternative estimators and results, and the available data could not support any one alternative estimator over another. The assumption of independence made by the usual DSE was even more restrictive, and appeared to be refuted by the data for adult males (see PREM 96).

### Housing-Unit Coverage Study (HUCS)<sup>21</sup>

The HUCS was designed to evaluate the coverage of housing units in the 1990 census. The major objective of this study was to provide evaluation data from the 1990 census for planning the next census. The HUCS sample was approximately 80,000 housing units, which was about half of the housing units from the PES. The PES was designed to evaluate the coverage of persons in the census.

The HUCS sample consisted of two parts—the P-sample and the E-sample. The P-sample was an independent listing of housing units in the sample blocks. The E-sample was the housing units enumerated in the census in the same sample of blocks. The P-sample and E-sample for HUCS were overlapping samples of approximately 80,000 housing units. The P-sample estimated the gross percentage of housing unit omissions within the census search area. The E-sample estimated the gross percentage of housing units erroneously enumerated in the census in the search area.

The addresses for the housing units in the P-sample were computer matched to the addresses in the census within the search area. The city-style addresses were not difficult for computer matching. However, the rural addresses and addresses for housing units within multiunit structures were more difficult to match by computer. The householders' names and other information, such as telephone number, were used to match the more difficult addresses. The match results were reviewed clerically using maps and other materials to resolve the match status for housing units with ambiguous or non-unique addresses. Some housing units with rural-type addresses were matched by comparing the location of the housing unit spotted on PES and census maps.

Housing units that did not match, unresolved cases, and possible duplicates were sent to the field for a followup interview. Clerks recorded the results of the followup interview and tabulated the final match results. An estimate of the number of housing units was formed using the dual-system estimator. The percent net undercount was calculated by comparing the census count to the dual-system estimates of the number of housing units.

<sup>21</sup>For more details and for variance estimates, see Preliminary Research and Evaluation Memorandums 236, 253, and 264.



## Dual-System Estimates

The housing unit coverage study was designed to produce an estimate of the net coverage of housing units within each poststratum in the form of a dual-system estimate. The dual-system estimate of the number of housing units within each poststratum was the census count times the probability of correct enumeration in the E-sample divided by the probability of omission in the P-sample.<sup>22</sup>

The dual-system estimates were computed for 180 poststrata. The poststrata were defined by census region, place type, size of structure, and occupancy/tenure status. The four census regions were northeast, south, midwest, and west. The three types of places were large urban (population of 250,000 or more), other urban (population of less than 250,000), and rural. The five classifications of size of structure were single-unit, small multiunit (i.e., 2 to 9 housing units), medium multiunit (i.e., 10 to 49 housing units), large multiunit (i.e., 50 or more housing units), and other structures (i.e., mobile homes, tents, vans, boats, etc.). The three categories of occupancy/tenure status were occupied by an owner, occupied by a renter, and vacant.

## Net Undercount

The objective was to estimate a net undercount using estimates of the housing unit omissions within the search area and the erroneously enumerated housing units within the search area. However, it was instructive to study the gross housing unit omissions and gross erroneous enumerations separately to investigate trends in the census.

The dual-system estimates of the housing units in the 180 poststrata were added to calculate an estimate of the total number of housing units. The estimated percent net undercount nationally was 0.96 percent with an estimated standard error of 0.24 percent. The gross estimated percent omission was 3.57 percent with a standard error of 0.20 percent. The gross estimated percent erroneous enumeration was 2.84 percent with a standard error of 0.20 percent. A gross omission did not necessarily mean the housing unit was missed in the census. A P-sample housing unit was classified as an omission when it was not located in the census within the search area (i.e., not matched to the census within the search area). An E-sample housing unit was classified as an erroneous enumeration when the housing unit should not have been enumerated within the search area. The six reasons for erroneously enumerated housing units were (1) within block duplicate, (2) surrounding block duplicate, (3) geocoding error, (4)

nonexistent as a housing unit, (5) insufficient information for matching and followup, and (6) the portion of unresolved cases imputed to be erroneously enumerated. An estimated 37.3 percent of the erroneous enumerations were nonexistent housing units, i.e., an estimated 1.06 percent of the census housing units were nonexistent as housing units. The percentages of erroneous enumerations by reasons were as follows:

| Reasons for erroneous enumerations      | Percent erroneous enumeration |
|---|-------------------------------|
| Within block duplicate . . . . .        | 18.9                          |
| Surrounding block duplicate . . . . .   | 14.5                          |
| Geocoding error . . . . .               | 16.2                          |
| Nonexistent as a housing unit . . . . . | 37.3                          |
| Insufficient information . . . . .      | 10.2                          |
| Unresolved . . . . .                    | 2.8                           |

Only the undercount in occupied housing units was of interest to many researchers because the undercount in vacant housing units did not affect the undercount of persons. The percentage net undercount was compared to the percentage of housing unit omissions and to the percentage of housing unit erroneous enumerations. The percentages of omissions and erroneous enumerations for vacant housing units were significantly greater than for the occupied housing units. The estimated percent net undercount for occupancy status was as follows:

| Occupancy status   | Net undercount (%) | Omissions (%) | Erroneous (%) |
|--------------------|--------------------|---------------|---------------|
| Occupied . . . . . | 0.53               | 2.54          | 2.17          |
| Vacant . . . . .   | 4.71               | 12.67         | 9.24          |
| Total . . . . .    | 0.96               | 3.57          | 2.84          |

A comparison of percent net undercount for the four census regions for occupied, vacant, and total housing units indicated no significant difference among regions. However, the percent undercount for the occupied housing units were significantly different from the vacant housing units in the midwest and in the west regions. The following are estimates of the percentage net undercount, omission, and erroneous enumeration for occupied housing units for the four census regions:

| Census region/<br>occupancy status | Net undercount (%) | Omissions (%) | Erroneous (%) |
|------------------------------------|--------------------|---------------|---------------|
| Northeast:                         |                    |               |               |
| Occupied . . . . .                 | 0.30               | 3.28          | 3.12          |
| Vacant . . . . .                   | 2.74               | 14.93         | 12.66         |
| South:                             |                    |               |               |
| Occupied . . . . .                 | 0.65               | 3.14          | 2.42          |
| Vacant . . . . .                   | 1.92               | 11.49         | 10.49         |
| Midwest:                           |                    |               |               |
| Occupied . . . . .                 | 0.47               | 1.58          | 1.27          |
| Vacant . . . . .                   | 7.39               | 13.55         | 7.61          |
| West:                              |                    |               |               |
| Occupied . . . . .                 | 0.61               | 1.99          | 1.89          |
| Vacant . . . . .                   | 9.22               | 12.21         | 5.31          |

<sup>22</sup>For details, see the following articles:

Howard Hogan, "The 1990 Post-Enumeration Survey: Operations and Results," *Journal of the American Statistical Association*, Vol. 88, No. 423 (September 1993), pp. 1047-1060.

Kirk M. Wolter, "Some Coverage Error Models for Census Data," *Journal of the American Statistical Association*, Vol. 81, No. 394 (June 1986), pp. 338-346.

For occupied housing units by type of place, the percent undercount for the rural place type was significantly greater than the large urban place type, but not greater than the other urban place type. For vacant housing units, the percent undercount for the rural place type was significantly greater than both the large urban and other urban place types. The definitional problem for "vacant and boarded-up" and "unfit for habitation" may be a factor in the large undercount in vacant housing units in the rural areas. The resort areas might have also contributed to the rural undercount for vacant housing units. In summary, the larger percent net undercount in vacant housing units was not evident in the urban areas. The rural areas had a larger net undercount than urban areas. The vacant housing units in rural areas had a larger net undercount than the urban areas. Estimates of the percentage net undercount, omission, and erroneous enumeration for the three place types for occupied and vacant housing units were as follows:

| Type of place/<br>occupancy status | Net<br>undercount<br>(%) | Omissions<br>(%) | Erroneous<br>(%) |
|------------------------------------|--------------------------|------------------|------------------|
| Large urban:                       |                          |                  |                  |
| Occupied .....                     | *-0.12                   | 1.84             | 2.04             |
| Vacant .....                       | 0.18                     | 7.07             | 8.30             |
| Other urban:                       |                          |                  |                  |
| Occupied .....                     | 0.81                     | 2.14             | 1.60             |
| Vacant .....                       | 1.87                     | 10.40            | 8.17             |
| Rural:                             |                          |                  |                  |
| Occupied .....                     | 1.67                     | 4.67             | 3.17             |
| Vacant .....                       | 10.21                    | 18.53            | 10.54            |

\*Suggests a slight overcount.

The estimated percent undercount for all housing units in the large urban place type was -0.09 percent (suggesting a slight overcount), 0.91 percent in other urban place type, and 3.16 percent in rural place type. The estimated percent undercount for the rural place type was significantly larger than both the large urban and other urban place types for total housing units.

In terms of reasons for erroneous enumeration, duplication, geocoding error, and nonexistent contributed to the erroneous enumerations for occupied housing units in large urban areas; insufficient information and unresolved housing units were rare causes. In other urban and rural areas, duplication was the major reason for erroneous enumeration. Nonexistent housing units were also a factor in the other urban and rural areas. In rural areas, insufficient information was a contributor to the erroneous enumerations. The reason for erroneous enumeration for vacant housing units was predominantly nonexistent enumerations for the three place types.

Estimates of the percentage net undercount, not matched, and erroneous enumeration for the five types of structures for occupied and vacant housing units were as follows:

| Size of structure/<br>occupancy status | Net<br>undercount<br>(%) | Omissions<br>(%) | Erroneous<br>(%) |
|--|--------------------------|------------------|------------------|
| Single:                                |                          |                  |                  |
| Occupied .....                         | 0.05                     | 1.97             | 1.92             |
| Vacant .....                           | 8.08                     | 14.90            | 7.02             |
| Small multi:                           |                          |                  |                  |
| Occupied .....                         | 2.11                     | 4.86             | 2.93             |
| Vacant .....                           | 3.35                     | 12.82            | 10.28            |
| Medium multi:                          |                          |                  |                  |
| Occupied .....                         | -2.19                    | 0.69             | 2.78             |
| Vacant .....                           | -3.90                    | 6.70             | 8.31             |
| Large multi:                           |                          |                  |                  |
| Occupied .....                         | 0.09                     | 0.44             | 0.85             |
| Vacant .....                           | -8.19                    | 5.82             | 13.11            |
| Other:                                 |                          |                  |                  |
| Occupied .....                         | 4.50                     | 7.28             | 3.81             |
| Vacant .....                           | 4.32                     | 17.77            | 15.75            |

The percentage gross omission for occupied housing units in small multiunit structures was significantly greater than for housing units in single unit structures. Also, the percentage gross erroneous enumeration for occupied housing units in small multiunit structures was significantly greater than for housing units in single unit structures.

In vacant housing units the percentage gross omission for housing units in single and small multiunit structures were not significantly different. The percentage erroneous enumeration for housing units in small multiunit structures was significantly greater than for housing units in single unit structures.

Geocoding error was 53.0 percent of the erroneous enumeration for occupied housing units in medium multi-unit structures. Duplication and the enumeration of non-existent housing units were also factors. The estimated percent undercount for all housing units was approximately 1.0; ignoring vacant housing units would have reduced the net undercount by about half (see PREM's 193 and 253).

## Ethnographic Evaluation

**Introduction**—For many years, the Census Bureau tried to understand the reasons behind net differential undercount and other types of census errors. The agency's statisticians and demographers generally had succeeded in measuring the problems ever since the 1950's, e.g., that persons had been missed within households, and that some entire households (and their housing units) had been missed. Conversely, in some cases, persons, households, and housing units had been enumerated erroneously.

Sociologists and communications experts also began looking for causes and solutions in the 1970's, but again primarily within the framework of the census itself: How, for example, could the enumerators best be trained to follow instructions? Results could be measured and compared. How much air time or printed space did the media contribute to the national publicity campaign? These things could

be quantified and a value put on them. During the 1980's, the 1990 test censuses warned of continuing and growing coverage problems: People were not responding to the standard enumeration, which tried to fit everyone into statistical categories of race, household relationship, and a specified geographic location.<sup>23</sup>

To find out why, the agency looked beyond its traditional disciplines for some insight and turned to anthropology for help. The anthropologist, Elliot Lebow, for example, had used methods based on ethnography and participant observation in his classic 1960's work, *Tally's Corner: A Study of Negro Streetcorner Men*.<sup>24</sup> Bureau staff members had posited in the mid-1960's that perhaps Black households, in particular, were subject to greater undercounting than White ones in the census because enumerators missed more of the housing units occupied by Blacks and because respondents had deliberately concealed the presence of Black men in their households. The evidence for this was rather sparse and indirect. In the late 1960's, therefore, the Bureau sponsored a pioneering study by two ethnographers in a low-income Black and Hispanic city block in Brooklyn, NY (Charles A. and Betty Lou Valentine, "Missing Men: A Comparative Methodological Study of Underenumeration and Related Problems").<sup>25</sup> This study was small, but it pointed to concealment, fear of disclosure, social and economic marginality, and similar themes. During the 1970's, the Bureau sponsored several uncompleted research projects by graduate students (rather than professional ethnographers) along these lines. The effort resumed in the mid-1980's, with three "systematic observer" studies conducted as part of the 1986 test census in Los Angeles, CA, in 1986. The researchers carried out ethnographic enumerations in three predominantly Hispanic neighborhoods, and Bureau clerks matched the results against the test census records. The Los Angeles studies, where replication across the multiple sites had been introduced, identified such barriers to enumeration as irregular housing and illegal housing-unit conversions, residents' undocumented status, and marginal relationships within extended-family households. In 1987, the Bureau established a formal program for undercount behavioral research to further explore these barriers and their sociocultural dynamics among specific "hard-to-enumerate" groups. There

were five ethnographic evaluations during the 1988 dress rehearsal for the 1990 census—at two sites in St. Louis, MO, a split site (blocks in two locations) in Columbia, MO, and two sites in eastern Washington State.<sup>26</sup>

In 1989, the Center for Survey Methods Research (CSMR) proposed a study plan starting with five hypothetical causes of coverage error. These were—

1. Mobility
2. Language and literacy barriers
3. Concealment to protect resources (e.g., illicit income) combined with disbelief in census confidentiality
4. Irregular (i.e., not conforming to census definitions) housing and household arrangements, and
5. Resistance, passive or active, as a strategy for dealing with outsiders, especially government.

With approval, CSMR began a program in 1990 called the Ethnographic Evaluation of the Behavioral Causes of Census Undercount. The Bureau signed joint statistical agreements (JSA's) with experienced ethnographers, who were to use these five hypotheses as starting points, and systematically examine them (and other related hypotheses they might develop), each in an approved sample area. There were 29 such areas throughout the continental United States and Puerto Rico. (A sample area consisted of approximately 100 housing units; these could be spread over 20 or more census blocks in rural areas or be a subsample of contiguous units within an urban census block if that block had more than 100 units.)

Within a few months after the 1990 census, the ethnographers carried out "alternative enumerations" (AE's) in their sample areas, using their own techniques. These could be participant observation, direct observation, ethnographic interviews, and other unobtrusive data-collection methods. Bureau staff compared the AE counts with the 1990 census counts for the sample areas. The subsequent evaluations were to explore and try to explain why people and housing units were missed in the census or counted more than once, why persons were erroneously included (or excluded) in certain households, and why geographic miscoding might have happened.<sup>27</sup>

**Sample areas**—Following are brief descriptions of the sample areas, arranged by race/ethnic concentration and urban/rural setting.<sup>28</sup>

<sup>23</sup>Elizabeth Martin, Leslie A. Brownrigg, and Robert E. Fay, "Results of 1988 Ethnographic Studies of Census Coverage and Plans for 1990," Sept. 11, 1990; and Leslie A. Brownrigg and Manuel de la Puente, "Alternative Enumeration Methods and Results: Resolution and Resolved Populations by Site," 1990 Decennial Census PREM 219 (March 1992).

<sup>24</sup>Manuel de la Puente, "Why Are People Missed or Erroneously Included by the Census: A Summary of Findings From Ethnographic Coverage Reports." [U.S.] Bureau of the Census, 1993 Research Conference on Undercounted Ethnic Populations, May 5-7, 1993...Richmond, VA, *Proceedings*, pp. 29-66.

<sup>25</sup>*Ibid.*, pp. 60-66.

<sup>23</sup>Cf. National Research Council, *America's Uncounted People*, Report of the Advisory Committee on Problems of Census Enumeration, Washington, DC: National Academy of Sciences, 1972, and *id.*, *Counting the People in 1980: An Appraisal of Census Plans*, Washington, DC: National Academy of Sciences, 1978; U.S. Bureau of the Census, Conference on Census Undercount, *Proceedings of the 1980 Conference*, Washington, DC, July 1980; and *id.*, 1980 Census of Population and Housing: *History* (1989), chapter 9. See also, Edwin D. Goldfield, "Review of Studies of the Decennial Census of Population and Housing: 1969-1992," Commissioned Paper Prepared for The Year 2000 Census Panel Studies, Committee on National Statistics, National Research Council, August 1992.

<sup>24</sup>Boston: Little, Brown and Co., 1966.

<sup>25</sup>Unpublished report prepared in 1971 under a joint statistical agreement with the Brookdale Hospital Center.

### *Black Urban Concentrated*

**Harlem, NY:** Located in central Harlem in the northern part of Manhattan Borough, the sample area was 98 percent Black. In the early part of the 20th century, Harlem was a working class, predominately Black area with well maintained housing units. By 1990, there were many deteriorated and abandoned buildings. The sample area itself was a contiguous section of one census block, populated by long-term residents as well as Blacks who had migrated from the South, the Caribbean islands, and Ethiopia. The area, which contained two churches and a parochial school, and its surrounding neighborhood had chronic problems with drug trafficking, drug use, and other crimes.

**Orleans Parish, LA:** The sample area was part of an economically deprived inner city urban area adjacent to a low-income public housing project and with a business district along its periphery. Illegal drug trafficking was commonplace on the side streets. Housing was deteriorated and some units were vacant or boarded up; many of the housing units were "irregular" and not easily found by someone unfamiliar with the community.

**Flint, MI:** This was an area marked by poor and overcrowded housing, crime frequency, and low income. The population was about 90 percent Black.

**Fort Lauderdale, FL:** The sample area was downtown. Since the early 1980's, waves of Haitian immigrants had been displacing some segments of the American Black population. Drug dealing, prostitution, and violent crimes were prevalent. Housing was low-rise and substandard, with hidden housing units and vacant lots.

### *Black Rural Concentrated*

**Logan County, OK:** The sample area, in a rural, almost all-Black town, had a population of in-migrants employed by the local university, students, and long-time residents. The sample area spanned three very small adjoining neighborhoods. The oldest sections contained converted housing units, irregular housing, and trailers situated behind single-family homes. The newer sections had residences built with government assistance.

**Holmes County, MS:** This predominantly rural county is 50 miles north of Jackson, the State capital. Agriculture was the main industry and the principal employer; manufacturing was insignificant. Unemployment was prevalent. Almost half of the sample-area population (believed representative of the county) received some form of public assistance, which provided more income than employment in agriculture and manufacturing combined. Virtually all of the residents were Black and almost 50 percent were illiterate. Housing consisted of modest one-family homes; some roads were not well marked or paved.

### *Black Urban/Suburban Heterogeneous*

**North St. Louis, MO:** This sample area was socially and economically heterogeneous: 35 percent White, 63 percent Black, and 2 percent Other. There was a blend of white- and blue-collar workers, with relatively affluent Whites, middle-class Blacks, and working poor of both races. There were homes of solid brick construction as well as wood frame homes in various stages of disrepair; there were some boarded-up properties and open areas with trash. Residential mobility was relatively high, as were housing vacancy rates.

**Carbondale, IL:** This was a quiet residential area with light industry and a university nearby. The population was racially mixed—about 40 percent Black, 55 percent White, and 5 percent Other. Most houses were for middle-income single families, but there was also a cluster of 20 mobile homes. Many of the homes and most of the trailers were rented to students, so residential mobility was relatively high.

### *American Indian Rural Concentrated*

**Isleta Pueblo, NM:** The sample area was one government-subsidized housing project in a Pueblo Indian community about 12 miles south of Albuquerque. Almost all residents were American Indians.

**Bladen County, NC:** The sample was in the county's Little Branch area recognized by the State (but not the Federal Government) as Waccamaw Sioux tribal land. Approximately 86 percent of the sample-area residents were American Indian and 14 percent White. Most residences were mobile homes or single-family brick houses. The community was stable, without much population mobility.

**Okfuskee County, OK:** This was an area, typical of east central Oklahoma, occupied by members of the Five Civilized Tribes (Cherokee, Creek, Seminole, Choctaw, and Chickasaw). Slightly over 62 percent of the residents were American Indian, about 33 percent White, and the remaining 5 percent Black. About 45 percent of the housing units were not occupied year round.

### *Asian Urban Concentrated*

**Chinatown, NY:** In the lower tip of Manhattan Borough, Chinatown was a long established ethnic neighborhood dating back to the 1870's. In 1990, the population density here was the highest in New York City. The sample area consisted of a row of six tenement buildings constructed in the early 1900's, with "railroad" type apartments (single rooms running front to rear) and no elevators. Almost all the residents were from various regions of China, and a sizeable number were elderly. Violence associated with gang wars was prevalent here.

**Koreatown, CA:** This community was located to the west of downtown Los Angeles, with one-third of the business properties and one-fifth of the residential real estate reportedly owned by Koreans. The sample area consisted of a government-subsidized building with 72 apartments, locked gates, and tight security against drug trafficking and gang violence. Slightly over 83 percent of its residents were Korean, and almost 50 percent of all residents were over 60 years old. All Korean residents over 18 years of age were immigrants.

**Queens, NY:** Koreans emigrated to Queens in sizeable numbers in the mid 1960's. The sample area was a 7-story brick building with 106 housing units and considered to be in poor condition. Slightly over 73 percent of its residents were Koreans or other Asians, about 20 percent were White, and the remaining 7 percent were Other.

#### *Asian Urban/Suburban Heterogeneous*

**Long Beach, CA:** The sample area was in a transitional section of the city, where in the 1980's, Cambodians began to replace the Blacks and Hispanics who had supplanted a largely White population in the 1960's. The community still had a sizeable number of Hispanics (about one-fourth of the total). In 1990, about 60 percent of the residents were Cambodians or other Asians, 32 percent White, and the remainder Other. Crime wars between Cambodian and Latino gangs were prevalent.

**South St. Louis, MO:** The sample area residents, in a racially mixed neighborhood, were 18 percent Laotian, Vietnamese, or other Asian; a little over 6 percent Black; and 75 percent White. The aging White population was being replaced by young Whites, Asians, Blacks, and Hispanics, with little "gentrification." The two- and four-unit homes that dominated the area were increasingly being rented out. Crime appeared to be on the rise, with drug trafficking and prostitution common in nearby areas.

**North Beach, CA:** This was a three-story, government-subsidized housing project covering two city blocks in San Francisco. The residents were about 40 percent Asian, 30 percent Black, 20 percent White, and the balance Other.

**Chicago, IL:** The sample area was the face of one census block that contained a large building abandoned after a fire, a building undergoing renovation, and a crowded rental apartment building housing single-person as well as large-family households. Almost 44 percent of the residents were Cambodians and other Asians, slightly over 28 percent White, a little over 9 percent American Indian, 8 percent Black, and the remainder Other.

#### *Hispanic Urban Concentrated*

**San Diego, CA:** The sample area was near the city's urban center, in an old neighborhood known as Sherman Heights, where Black and Hispanic families began replacing Whites in the 1930's. In 1990, the population was largely Hispanic, with many undocumented immigrants from Mexico. Housing was a mixture of old, now multiunit, mansions and low-rise single-family homes in disrepair, and many irregular housing units. There was drug dealing, gang violence, and other criminal activities in and around the sample area.

#### *Hispanic Rural Concentrated*

**Santa Barbara County, CA:** The sample area consisted of 133 contiguous housing units within a relatively new development within a rural farmworker town. About half of the homes were built by a nonprofit corporation and the rest by a private developer. Almost all the residents, some of them immigrants, were of Mexican descent. Many were agricultural workers, but not migrant or seasonal; they considered the sample area their permanent home.

**Marion County, OR:** The sample area was part of a small farming community, Woodburn, with housing shortages and an annual influx of migrant agricultural workers. The sample area consisted of (1) migrant-worker housing, (2) owner occupied tract homes occupied mainly by lower-middle-income White households, and (3) a development of young, working-class couples, single mothers, and socially integrated Hispanics. Some households in (3) were on public assistance and living in units rented by the month.

**Hartford, CT:** The sample area, of low-rise apartments and single-story homes in poor condition, was in one of the oldest neighborhoods, to which Blacks began migrating in the early 1900's. Puerto Ricans arrived in the 1940's. Population distribution in 1990 was 70 percent Black, 20 percent Puerto Rican, and 10 percent West Indian. English was the dominant language. The unemployment rate was high and over half of the households had incomes below the poverty line. Observers reported drug and gang activity.

**New Orleans, LA:** The sample area, 9 apartment buildings (about 100 contiguous housing units) in a 36-building development originally built for subsidized housing, was in Kenner, a New Orleans suburb. The apartment complex reportedly was well kept and in relatively good condition. Many low-income families resided there. Slightly over 66 percent of the residents were White, over 8 percent Black, nearly 5 percent Asian, and about 20 percent Other; Hispanics comprised almost 61 percent of the total.



## *Undocumented Urban Concentrated*

**Bronx, NY:** The sample area, containing two adjacent and identical apartment buildings in poor condition, with a total of 91 apartments, was in the heart of the south Bronx. Over 90 percent of the residents were classified as "Other" race and an equal proportion were Hispanics, mostly Puerto Ricans, Mexicans, and Dominicans. A sizeable number of the latter two groups were thought to be undocumented immigrants.

**Miami, FL:** The sample area was a small segment of single- and two-story, often subdivided, homes in "Little Haiti," a parcel approximately 50 by 10 city blocks about 3 miles north of downtown Miami. Most of the sample-area residents were recent immigrants with little or no formal schooling and/or facility in English, and worked in low-level service jobs. Many of the homes were in need of repair. Drug dealing and other crime was reportedly common in Little Haiti.

**Santurce, PR:** The sample area was in Barrio Gandul, in the southwest part of Santurce, and contained two- or three-story buildings with small apartments and rooms to rent as well as businesses. Some housing units were difficult to find. Slightly over half of the housing was considered to be in good condition; the remainder was in need of repair. Puerto Ricans comprised 63 percent of the sample-area residents and Dominicans 33 percent; many of the latter were thought to be undocumented.

## *Undocumented Urban/Suburban Heterogeneous*

**Long Island, NY:** The sample area was in a bedroom community on the "North Shore" of Long Island settled by Italian immigrants around 1900. Puerto Ricans and Blacks arrived in the 1940's, and newer immigrants, including many Salvadorans, in recent years. Housing was a mixture of single-family homes and low-rise apartments, many of them further subdivided into rental units. About 28 percent of the residents were Black, 22 percent White, and 50 percent Other. Almost 52 percent of the total were of Hispanic origin.

**Houston, TX:** The sample area was 1 building of 5 in a 645-unit apartment complex, generally in good condition. Many units contained doubled-up families and unrelated household members. Most of the occupants (83 percent) were recent immigrants from Central America or Mexico, with a significant portion thought to be undocumented. The observers did not detect any illegal activities, such as drug dealing and drug use.

**San Francisco, CA:** The sample area, with a mixture of residential and commercial structures, was in the Mission District of the city. The population had a high concentration (60 percent) of Hispanics, immigrants from Mexico and Central America, and the balance

non-Hispanic Whites, Chinese, Filipinos, and Blacks. Housing tended to be substandard and crowded, with many families doubling up and/or taking in boarders. Some buildings contained illegal and hard-to-find housing units.

### **Causes of census omissions and erroneous inclusions—**

In general, the studies found that the reasons why individuals were missed or erroneously enumerated in the 1990 census were varied and complex. In almost all the sample areas, no single cause could be identified, but rather there seemed to be a whole constellation of factors that interacted and contributed to the differential net census undercount/overcount. These included irregular (i.e., not conforming to census definitions) household arrangements and housing, little or no knowledge of English (and in some cases illiteracy in any language), fear of government that led to concealing information, and missed or erroneously enumerated housing units.

**Irregular and complex household arrangements** was a key reason for within-household omission or within-household error: Members could not easily be related to person 1 on the questionnaire and may not have been listed on the census roster. Alternatively, household members that should have been included might have been excluded. Such situations arose when respondents had language difficulties and did not understand the census rules of residence and/or defined the term "household" differently from the census. In general, irregular and complex households had one or more of the following features: (a) unrelated individuals, (b) mobile or ambiguous household members, (c) formation for the sole purpose of sharing the rent and/or other living expenses, or (d) two or more "nuclear" families.

Complex or "ad hoc" households based on pooled resources were common in sample areas populated with recent immigrants, especially of Hispanic origin and appeared to be practical responses to poverty and a lack of affordable housing. However, the householder, identified as person 1, might not view boarders or other unrelated individuals as part of the core household and therefore list only family members. Other factors included the respondent's determination that a particular person was a temporary resident ("just passing through" with the stay construed as anywhere from 2 weeks to 4 years) or, conversely that grown children living in homes of their own elsewhere were still members of the enumerated household. The studies found culturally defined notions of family and residence that were difficult (and often not possible) to capture on the census form: "Residence" did not necessarily indicate where a person lived or received mail, but rather a place where someone lived who would know how to contact that person, for example.

Irregular housing was a dominant cause found in many of the 29 areas where entire households were omitted from the census. It was estimated that as many as 40 percent of the persons who should have been enumerated were not,

because the housing unit had been missed or erroneously identified. Irregular housing referred to housing units that had one or more of the following characteristics: (a) hidden from public view, usually in back yards or down rural roads (difficult for anyone unfamiliar with the community to find), (b) illegally built, usually in single-family homes or garages, (c) lacking clear unit designator, such as apartment number, house number (in rural areas), or a specified mailbox, or (d) in areas where the condition and number of units in otherwise similar buildings varied inconsistently. Variations on these situations included buildings that appeared abandoned but were not, what seemed to be single-family dwellings that in fact contained numerous housing units, and people living in warehouses or other nonresidential structures.

The studies cited many examples of **residential mobility**—a key feature of irregular and complex households and major reason for coverage differences. Some instances were students moving during the academic year, persons moving from household to household until they found steady employment and could afford their own places, individuals frequently travelling back and forth across the U.S. borders, and persons in transit using a particular household as a “way station.”

**Fear and apprehension** on the part of sample-area residents with regard to government and outsiders often led to their concealing information from the census and sometimes from the ethnographers as well. In general, several grounds for fear interacted: drug dealing, drug use, and other activities such as violations of zoning, public housing, welfare, or immigration rules; the existence of an “underground economy;” violent crime including “gang wars;” and distrust of government. For the census, this last meant a widely held belief that the data were not confidential. Any of these conditions would inhibit both direct and indirect communication by and with the census.

**Language and illiteracy barriers**, where known, could be overcome with outreach, translation (especially by bilingual persons), and cultural sensitivity. Many individuals, literate in a language other than English, however, were found to open only that mail which was addressed to them personally and in the language they used. The mass-mailed decennial census did not lend itself to such tailoring.

**Recommendations**—Based on their studies, the ethnographers advocated the following steps at the local level:

- Increase involvement of community-based organizations in planning and carrying out the census.
- Make greater use of local media, such as newspapers, radio, and television, in the language of the target population.
- Recruit more local community leaders to promote the census.

- Hire enumerators who reflect the racial, ethnic, and cultural composition of the target population and preferably are residents of the communities they canvass. They should be culturally sensitive and, where necessary, bilingual.

They recommended several strategies:

- Teach enumerators how to seek out hidden housing units.
- Produce more accurate address lists, particularly for rural areas, with the help of local residents and mail carriers, not landlords or rental agents.
- Make the Spanish-language questionnaire more accessible to households.
- Use racially, ethnically, and gender-mixed enumeration teams.
- Station enumeration teams in public places (e.g., shopping malls) to distribute questionnaires and assist respondents.

For future censuses, such as for 2000, several ethnographers suggested research into changing the census definition of a household and/or modifying the manner in which household members are to be listed on the questionnaire. They identified several major forces that influence household complexity, namely, the culturally based definitions of “household” and “family”; economic need; and the conditions encountered by immigrants of any national origin. These forces, they said, vary by race but nevertheless interact to produce households containing members who are (a) unrelated to other household members, (b) mobile and with ambiguous status within the household, or (c) related to a single-family unit in households that contain two or more family units. To determine if and what type of changes in the census rules of residence will capture the complexity of households, the Bureau should look to in-depth interviews, focus groups, and other qualitative modes of data collection and analysis. These should show why complex households are formed and how they function; the staff then could test alternative questions intended to enumerate all persons in a given household.

Several ethnographers with sizable Hispanic populations in their sample areas noted that these persons, regardless of national origin, had difficulty with the race and Hispanic-origin questions. In general, Hispanics, especially recent immigrants, did not view race (White, Black, American Indian, etc.) as a dichotomous variable. Rather, for them, race was a continuum that reflected the racial mixing found in Central and South American countries. Elsewhere, people who were otherwise of mixed race, such as part American Indian, Black, White, or Asian had similar problems identifying themselves and did not find “Other race” a satisfactory answer. Further, some Asians or Pacific Islanders had difficulty making a selection because



their particular origin (e.g., Cambodian) was not specifically listed on the questionnaire. These ambiguities may have resulted in undercounts within categories.<sup>29</sup>

## OUTREACH PROGRAMS

### Evaluation of Outreach

Census promotion is a key component of the census process. The 1990 outreach campaign worked to inform people of the impending census and stressed the importance of correctly enumerating the entire population. The messages urged household members to quickly complete and return the mailed questionnaire.

The two-wave outreach evaluation survey (OES) was undertaken to measure the success of the program in fulfilling its goals and the combined effect of the various projects. The OES explored the effectiveness of the assorted techniques and the impact the campaign had on various racial/ethnic groups.

The Census Bureau incorporated many sources in the promotion of the 1990 census. Nationally, the Bureau used the services of the Advertising Council to create a national television, radio, and print advertisement campaign package. The Advertising Council enlisted three minority advertising agencies to focus on the African-American, Hispanic, and Asian/Pacific Islander populations.<sup>30</sup> Television and radio commercials were aired (in English and other languages), and print advertisements, such as billboards, magazines, and posters were used.

The Field Division's Census Awareness and Products Program (CAPP) was a community-based effort to acquire census support and participation. The CAPP organization and other Bureau units worked to promote the census through workshops and presentations at community-based meetings, exhibits at national organization meetings, and audiences with community leaders and service providers in high minority areas. In addition, many States, cities, and minority media had campaigns encouraging census participation in 1990.

The Census Education Project also was an attempt to promote the census. This program promoted the census within the school system. Project personnel dispensed, to teachers, curriculum materials designed to incorporate census information into lesson plans. These materials often targeted schools with high minority enrollment, where the parents of the children may have had poor English skills. The goal was that the children would in turn help their parents interpret and complete the census questionnaire.

The OES was quite similar to the Knowledge, Attitudes, and Practices (KAP) survey which assessed the 1980 decennial census outreach program. These two surveys will be compared in the analysis of the 1990 census publicity campaign.

The Bureau obtained the OES sample from the ACF and used personal visits for the interviews. A total of 5,000 people were interviewed in two waves; the first wave took place in late January/early February 1990 (prior to the mailing of the census form), and the second, between April 9 and May 9, 1990 (after households had received their census questionnaires).

The wave 1 questions were concerned with knowledge and awareness of the census and attitudes toward the census. Questions were asked such as, "Through what media did you hear about the census?" and "Is the census used to locate illegal aliens?" Wave 1 provided the "before" answer to the questions. All wave 1 questions were subsequently asked in wave 2 to discern any changes in subject response following receipt of the census questionnaire. Wave 2 also asked questions concerning subject response to the questionnaire. Questions centering on the reception, completion, and subsequent mailing of the form were asked only of the wave 2 sample households.

The results of the OES were compared to the results of the 1980 KAP survey, which also had been taken in two waves, late January/early February and mid-March 1980. A private contractor drew the KAP sample and interviewed of 2,431 people in wave 1 and 2,446 people in wave 2. Interestingly, the response rates for both waves of the KAP survey were well below the response rates for the 1990 OES. Only 64 (wave 1) and 79 percent (wave 2) of eligible households participated in the KAP survey. This contrasts to the 95- and 94-percent response rate for the OES. (This variance in the response rate may temper somewhat the results of comparing the two surveys.)

To measure awareness of the census, numerous steps were taken. In early 1990, VITT Media International, Inc. contracted to measure the number of public-service announcements (PSA's) aired, newspaper placements of print advertisements, and census-related news pieces for six major markets. The media examination concluded that the census campaign ranked third among all national advertisers in total "media presence." PSA's made up the bulk of the census ad campaign (about 75 percent), with census-related news stories also contributing heavily to the mix.

To check how the census publicity affected census awareness, the OES sample population was asked the question, "Have you seen or heard anything recently—within the last month or so—about the census of the United States?"

Results to the 1980 and 1990 versions of this question were as follows:

| Race/Hispanic origin          | 1980 KAP                               |        | 1990 OES |        |
|-------------------------------|--|--------|----------|--------|
|                               | Wave 1                                 | Wave 2 | Wave 1   | Wave 2 |
|                               | (Percent who recently heard of census) |        |          |        |
| Total . . . . .               | 40.7                                   | 72.5   | 56.9     | 90.6   |
| White, non-Hispanic . . . . . | 44.1                                   | 73.7   | 59.2     | 93.2   |
| Black, non-Hispanic . . . . . | 37.3                                   | 65.8   | 47.0     | 78.4   |
| Hispanic . . . . .            | 24.5                                   | 74.8   | 54.4     | 89.7   |
| Other . . . . .               | —                                      | —      | 48.1     | 80.8   |

<sup>29</sup>*Ibid.*  
<sup>30</sup>In Puerto Rico, a separate advertising agency (West Indies & Grey) handled the outreach campaign. The Institute of American Indian Arts, a non-profit organization, was selected to promote the census among the American Indian population. (For further information on the outreach and promotion campaign, see ch. 5, "Census Promotional Program.")

The OES results uncovered statistically significant increases in respondent awareness between waves within each race/ethnic group. However, by wave 2 the percentage of the Hispanic population who had heard recently of the census was significantly different than the Black population percentage. The 1990 outreach appeared to have done a much better job reaching the Hispanic community than reaching the Black community. There were no significant differences revealed between the Hispanic and White populations.

The time period of the KAP second wave makes it difficult to compare results. It had been done in mid-March, prior to respondent reception of the questionnaire, while the OES second wave took place after the forms were received in April. At any rate, the results of the OES demonstrate a relatively high level of awareness of the 1990 census.

Much of the outreach effort in both 1980 and 1990 focused not only on increasing awareness of the census but also increasing general census knowledge. The KAP survey and the OES asked a series of questions to determine understanding of census result uses. Questions asked in both surveys included—

- Is the census used to decide how much money communities will get from the government?
- Is the census used to decide how many representatives each State will have in Congress?
- Is the census used to see what changes have taken place in the United States?
- Do the police and FBI use the census to keep track of people who break the law?
- Is the census used to help business and governments plan for the future?
- Is the census used to locate people living in the country illegally?

(Questions may have been worded slightly differently in the two surveys.)

Results of the knowledge item questions were as follows:

| Item                          | 1980 KAP          |        | 1990 OES |        |
|-------------------------------|-------------------|--------|----------|--------|
|                               | Wave 1            | Wave 2 | Wave 1   | Wave 2 |
|                               | (percent correct) |        |          |        |
| Community funds . . . . .     | 46.1              | 53.4   | 50.7     | 63.4   |
| Apportion Congress . . . . .  | 65.4              | 62.5   | 63.8     | 65.9   |
| Demographic changes . . . . . | 72.1              | 77.8   | 75.4     | 80.8   |
| FBI/police purposes . . . . . | 57.6              | 61.3   | 48.2     | 57.0   |
| Government planning . . . . . | 74.3              | 76.4   | 77.3     | 77.0   |
| Locating aliens . . . . .     | 43.3              | 50.2   | 38.0     | 45.5   |

In 1990, significant differences between the correct answers given in waves 1 and 2 were uncovered for four questions, two of which dealt with the misconception that the census is used to track and locate individuals. That fallacy abated somewhat over the time between the two waves.

Knowledge level of the census did not vary much from 1980 levels. A slight increase in census knowledge was revealed, but the small increase could easily be attributed to the fact that most OES respondents had already viewed the census questionnaire.

Between racial/ethnic groups, variability of census knowledge was disclosed. Wave 2 OES data revealed that Whites averaged 4.1 correct answers (out of six); Hispanics, 3.9 correct; "Other," 3.4; and Blacks, 2.8. All racial/ethnic groups increased their knowledge of the census between the two interviews, except for Blacks. This again underscored that the 1990 outreach effort may not have been particularly successful within the Black community.

Questions to discern general attitudes about the census were also asked in the 1990 outreach evaluation. Many people hypothesized that a general public attitude of indifference and mistrust led to lower-than-expected participation rates in 1990. To determine public attitude toward the census, interviewees were asked whether they agreed or disagreed with the following statements:

- The Census Bureau's promise of confidentiality can be trusted.
- The census is an invasion of privacy.
- It's important for everyone to be counted in the census.
- The Census Bureau would never let another government agency see my answers to the census.
- People's answers to the census cannot be used against them.
- Taking part in the census shows I am proud of who I am.

The corresponding results:

| Item                          | 1980 KAP                       |        | 1990 OES |        |
|-------------------------------|--------------------------------|--------|----------|--------|
|                               | Wave 1                         | Wave 2 | Wave 1   | Wave 2 |
|                               | (percent responding favorably) |        |          |        |
| Can trust promise . . . . .   | 66.0                           | 73.3   | 78.4     | 79.0   |
| Invasion of privacy . . . . . | 76.4                           | 78.4   | 80.9     | 73.4   |
| Important to count . . . . .  | —                              | —      | 95.1     | 93.3   |
| Agencies can't see . . . . .  | —                              | —      | 59.0     | 64.1   |
| Not used against . . . . .    | 65.7                           | 72.2   | 78.4     | 81.0   |
| Census show pride . . . . .   | —                              | —      | 86.9     | 82.4   |

It does not appear that the public viewed the census any more negatively than it did in 1980. However, according to the OES, the outreach effort proved to have little or no effect on public attitude of the census. In fact, response rates to two questions indicated a significant deterioration in attitude between the two interviews. The timing of the wave 2 interview could have led to those results. Most OES households would have recently completed and mailed back their questionnaire and may have been likely to judge the census harshly (especially privacy questions).

Evaluation of the OES indicates that the Bureau's promotion of the 1990 census served a very definite purpose. Increasing public awareness was achieved and by Census Day over 90 percent of the population had heard or seen something about the decennial census. Census knowledge also was increased through the outreach program, although not to the extent that the Bureau

had hoped. All racial/ethnic groups, with the exception of Blacks, increased their "census knowledge," and by Census Day, Hispanics were as knowledgeable as Whites.

According to OES data, there was also a definite positive relationship between census awareness and exposure, knowledge, and the propensity to mail back the census form. As knowledge increased, the likelihood of mailing back a form increased. However, without testing for various control variables, it was futile to attempt to determine whether there was a causal relationship (see PREM 97).

## QUALITY ASSURANCE FOR 1990 CENSUS OPERATIONS

### Introduction

Quality assurance (QA) is different from quality control. QA includes all components of management, such as production, timeliness, and accuracy. Quality control is only one part of the broader QA concept. The Census Bureau has long implemented quality control and has applied it to virtually all operations. Also, the Bureau employed many separate components of QA, but integrating them under one umbrella involved a change in philosophy and management approach for the 1990 census.<sup>31</sup>

The Census Bureau decided the 1990 census QA program would have four major goals: (1) to build quality into census procedures and operations, (2) to design a system that could be continuously improved, (3) to integrate responsibility for quality with production, and (4) to distinguish clearly between QA and quality control. A decennial census is a decentralized large-scale operation completed by a large number of permanent and temporary workers during a very short period of time. The Bureau identified several key areas on which to focus its QA efforts in the 1990 census: (1) design operations to be straightforward and efficient, (2) train the staff, (3) measure what had been learned during training, and (4) assume the staff wants to do a good job and give them the tools to improve. A major challenge was to design a system that would measure the quality of the work, quantify error characteristics, and transmit the information back to management quickly enough to enable managers to relay suggestions for improvement to employees while an operation was still in progress. To reduce the possibility of friction between the production and quality control staffs, the new approach for 1990 made the production side responsible for quality as well.

### Components of the Quality Assurance Program

To support the new philosophy, the agency held a series of seminars to educate both management and staff. The

<sup>31</sup>Most of this section was summarized from the 1990 Census of Population and Housing, *Evaluation and Research Reports: Effectiveness of Quality Assurance*, 1990 CPH-E-2 (Washington, DC: Government Printing Office, 1994). Also see the Preliminary Research and Evaluation Memorandum (PREM) series for further information.

Bureau also undertook several pilot programs to demonstrate the effects of the new approach and implemented it at all levels and across virtually all operations in the 1990 census. The Census Bureau brought about improvement in total quality using the following techniques.

**Automation**—The increased use of automation made it possible to apply the new QA approach to areas that would have been impossible in 1980. In regional, district, and processing offices, as well as at headquarters, the growing number, capacity, and flexibility of computers and other digital electronic equipment made it possible for the Census Bureau to improve the capture, analysis, and dissemination of information on the status of the operations. One of the basic properties of an effective QA program is the speed with which feedback is given to employees. Automation provided a means by which data and their interpretation could be turned around rapidly.

**Communication**—Effective communication is another element of a successful QA program. In general, good communication is one of the keys to producing the best product possible. The Bureau made the following efforts to maintain good communication.

*Working groups*—It developed internal census working groups that consisted of an analyst from each discipline necessary to design and implement a specific operation. These individuals made up the communication team. Their functions included evaluating ideas, defining objectives and requirements, reviewing specifications and procedures, as well as planning, monitoring, and problem solving.

*Reduced supervisor-employee ratio*—The Census Bureau required first-line supervisors to manage fewer employees. This enabled supervisors to have more time for reviewing employees' work and providing timely and accurate feedback.

*Quality circles*—A quality circle consists of a team of managers and employees who meet periodically to discuss quality status and related issues and to resolve problems. The Bureau used this concept primarily in the processing offices for coding operations. The quality circle for a specific operation met once a week and documented and distributed the results from each meeting to all employees and management staff.

*On-site observers*—One QA technician was assigned to each of the 13 RCC's and to each of the 7 processing offices (PO's) as an on-site observer. The primary skill these observers needed was a thorough knowledge of the operations and their QA requirements. Each QA technician monitored adherence to QA specifications and advised local management on making administrative or operational decisions that did not adversely affect QA requirements.

*Problem resolution*—The Bureau established a problem resolution system in the processing offices. The purpose of this system was two-fold: (1) it provided local management with a vehicle to identify problems or request clarification to procedures or software and receive quick resolution, and (2) it allowed appropriate headquarters divisions an opportunity to resolve problems in ways that would minimize negative effects on their specific requirements.

All problems were documented and transmitted to headquarters for review. The Bureau's Decennial Operations Division consulted with the sponsoring division which generated the specification. After reaching a solution, various subject matter divisions cleared the documentation before transmitting the resolution to all processing offices.

**Training**—The education and training of production staff is an important component of the total QA concept. The Census Bureau created over 400,000 temporary jobs in more than two dozen major field and processing operations; instituted on-the-job training; strengthened enumerator training, pay, and management; and improved the training materials for all 1990 census operations. Training included learn-by-doing exercises, mapreading, and computer-based standardized instructions. The Bureau increased supervisory effectiveness by reducing the ratio of enumerators to crew leaders.

The Census Bureau trained supervisors from the seven processing offices with hands-on implementation of software and work flow procedures. A part of the training was a 3-week integrated test held in January 1990 at the Baltimore PO to prepare the staff to process the questionnaires (for further details, see ch. 7). The Bureau used comments and observations from the test to make adjustments to operations and increase processing efficiency.

**Measurement Techniques**—One of the basic objectives of a successful QA system is the ability to accurately measure performance by identifying errors, documenting the characteristics of the errors, and providing information to management on error levels and characteristics. To meet this objective, the Bureau used several different methodologies due to the diversity of decennial operations:

*Pre-operational sampling*—For some census operations, such as address list development, a prior sample frame did not exist. For the prelist operation, since the staff was creating the address list, no prior lists existed from which a sample could be selected. Also, it was not feasible to select a sample after the completion of the workunit because of operational constraints, such as (1) verification of a sample after the initial listing would require the lister to be idle while this listing was done and the quality decision determined, (2) any decision could only be reached after a substantial amount of work had already been completed, and (3) such an approach would require an independent staff of QA listers to be in the field at the same time as the regular listers, presenting a difficult management and public perception problem.

These characteristics resulted in the development of an early sample of work done prior to the actual start of the operation. A body of work was used to match to the actual data as they were done, and this provided an immediate measurement of the quality of the job. There were several benefits of this approach: (1) QA listings were completed weeks ahead of time and were managed under their own organizational structure and controls, (2) QA data were immediately available to supervisory personnel to be used to measure the quality of the listing work, and (3) managers of the listing operation gained valuable experience prior to the start of the operation during the initial identification of the sample. If a workunit showed an unacceptable level of errors, the supervisors researched the case to determine if the enumerator was indeed responsible for the error, and if so, took appropriate action ranging from a discussion of the specific case to retraining or reassignment to a different area. Data on all aspects of the QA operation were maintained for both concurrent monitoring and the creation of a post-operational database for analysis.

The Bureau used a variant of this technique for the coding operations. A sample of the noncomputer coded cases was selected prior to coding, replicated three times, distributed among three workunits, and coded independently. A measure of the individual coding quality level for each coder was obtained by comparing the coding results for this sample against the "true" codes determined by the three coders using the majority rule to decide on differences among the coders.

*Post-operational sampling*—For most of the clerical and all of the data entry operations, it was possible to measure the quality and provide feedback by selecting a sample from the workunit subsequent to the operation. The QA was independent or dependent based on the level of automation of the processing operation. Automation allowed for an independent verification in all of the data entry operations. Clerical processing operations were dependently verified. During independent verification, if the number of detected differences exceeded a predetermined tolerance, the workunit was rejected and redone. For the dependent verification, a sample of work was reviewed to determine the level of errors. If this number exceeded a predetermined tolerance, the workunit was rejected. The quality statistics were monitored at both the workunit and individual clerk levels.

The Bureau relied on post-operational sampling with independent verification for all data entry operations and for certain clerical processing jobs, such as edit/review, search/match, microfilm duplication, and the Film and Automated Camera Technology for 1990 (FACT90) operation.

*Concurrent monitoring*—For operations, such as urban update/leave, update/leave, and telephone assistance, a procedure was designed to verify that the employee understood the proper 1990 census procedures before being allowed to work independently. The supervisor monitored/observed the employee's work for a specified period. At the

end of the monitoring period, based on the number of errors detected, a decision was made as to whether the employee could work independently or should be re-assigned.

*Reinterview*—In 1990, approximately 60 percent of the housing units were enumerated by the household mailing back the census questionnaire to the appropriate DO or RCC; the remaining 40 percent were enumerated by census enumerators. To protect against census enumerators falsifying data, a sample of work was selected daily from the enumerators to be reinterviewed. Whether or not potential data falsification occurred was determined by comparing the reinterview responses to the original responses for selected roster items. The supervisory staff researched the cases that showed evidence of potential data falsification, determined if actual falsification had occurred, and if so, what appropriate administrative actions should be taken.

*Suppression of pre-operational sample*—In the prec canvass operation, enumerators were instructed to canvass their geographic areas, adding to and updating the address list, as necessary. A measure of their performance was obtained by calculating the proportion of suppressed addresses returned as adds.

## Preparatory Operations

**Short and long form package production**—In 1989, the Bureau awarded contracts for producing approximately 82.9 million short-form packages and 17.2 million long-form packages.<sup>32</sup> The QA plan consisted of visual and mechanical on-line verification of systematic samples of clusters of two or three consecutive package components during each stage of the production process. The Data Preparation Division (DPD) in Jeffersonville, IN, performed an independent verification for subsamples of the inspected questionnaires. Various factors affected the reliability of the evaluation for the operation—the correctness of the QA records provided by the contractor, the legitimacy of the samples delivered by the contractor, etc. The 1990 printing contract specifications, monitored by means of QA requirements, gave the Census Bureau a wide “margin of safety” ensuring a top quality product and minimizing the introduction of data errors at conversion.

The QA assessment for the short form showed 5.1 percent of the 2,381 printed rolls of questionnaires were detected to be in error and, for the long form, 9.2 percent of 1,185 printed rolls were in error. The most frequently occurring error was out-of-tolerance unprinted spots in the index squares or vertical bars. Poor type quality or uniformity was the second most frequent error. The QA plan enabled early detection of the errors and helped reduce the

problem. For packaging, most of the problems included damaged questionnaires and the inability of the contractor to store the packages for postal pick-up.

The post-imaging inspection of the short and long forms estimated that incoming error rates for the short and long forms were 3.1 and 2.4 percent, respectively; the estimated outgoing error rates for the short and long forms were 0.8 and 0.0 percent, respectively.

Form D-852 (Envelope Printing/Construction Verification Quality Assurance Record) recorded the results of the inspected outgoing and return envelopes for both short- and long-form questionnaires. From the 1,988 samples inspected for the short form, the estimated incoming and outgoing error rates were 4.8 and 3.3 percent, respectively. Over 80 percent of the errors were attributed to poor type quality or uniformity; however, these errors were not critical. For the long form, QA data were received for less than 5 percent of the envelopes produced. None of the samples selected were detected to be in error.

Assembling the packages involved the insertion of a questionnaire, instruction guide, return envelope, and motivational inserts into the outgoing envelope. Based on the 5,382 samples inspected for the short form, the estimated incoming and outgoing error rates were 9.0 and 6.7 percent, respectively. Over 60 percent of the errors detected were attributed to torn or damaged material. For the long form, 12,688 samples were inspected. The estimated incoming and outgoing error rates were 0.3 and 0.03 percent, respectively.

For the packaging verification, there were two types of packages—mailout/mailback and update/leave. For the mailout/mailback packages, a sample of ZIP Codes and the five-digit and residual sorts within the sampled ZIP Codes were inspected. For the update/leave packages, the materials were sorted by the appropriate field district office. For the mailout/mailback packages for the short form (based on 915 cases), 8.1 percent of the sampled ZIP Codes contained missing mailing packages. These accounted for 0.06 percent of the sample. For the update/leave packages, approximately 12.6 percent of the 1,041 sampled address register areas (ARA's) contained missing packages. They accounted for 0.04 percent of the sampled packages. For the long form, 3.4 percent of the sampled boxes contained missing mailout/mailback packages.

For the long form, the results of the inside page inspection estimated incoming and outgoing error rates at 3.2 and 0.0 percent, respectively. No QA records were received for the printing of the instruction guides and motivational inserts for the short forms. The reason for this was not known. QA records were received for the printing of the motivational inserts for the long-form package, but not for the instruction guides. The reason for this was not known. For the printing of the motivational inserts, 11 clusters out of 1,239 inspected clusters were detected to be in error. The estimated incoming and outgoing error rates were 0.9 and 0.0 percent, respectively. The types of errors detected for the defective clusters were not specified on the QA forms (also see PREM's 99, 103, 138, 188, and 246).

<sup>32</sup>In addition to the mailing packages, the contractors also produced other data collection forms, envelopes, motivational inserts, etc. For more detail, see chapter 4 of this *History*.



The binding operation for the long-form package consisted of gathering the inner pages into the outer leaf, stitching, trimming, and folding. The inspection results estimated incoming and outgoing error rates at 1.6 and 0.3 percent, respectively. The most frequently occurring error was missing staples. Improperly applied staples was the second most frequent error.

The Census Bureau's improved working relationship with the Government Printing Office greatly improved the printing process from that of the previous censuses. Overall, the 1990 QA system had a positive effect on the production of the questionnaire packages.

**Prelist**—The 1988 prelist took place in small cities, suburbs, and rural places in mailout/mailback areas where vendors' address lists could not be used. In these areas, enumerators listed housing units in their assignment areas. The 1988 prelist operation included 65,593 ARA's with 27,895,927 total housing units. The QA operation for the 1988 prelist was designed to meet the following objectives: (1) to build quality into the system rather than relying on inspection to protect against major errors, (2) to control coverage errors in listing addresses, and (3) to provide feedback to enumerators and managers on errors to improve the quality performance of the operation. To help the supervisor monitor the quality of the listing, sampled addresses were listed in advance in sampled blocks within the address register areas, as well as map spotted. The field supervisor matched the sample addresses obtained during the advance listing operation to the addresses listed by the enumerators during the actual operation to identify possible coverage and content errors. The quality of the information gathered for the living quarters was termed "listing error rate." The national listing error rate was 2.40 percent indicating that approximately 665,645 living quarters were initially listed incorrectly. The regional census centers of Boston and Seattle recorded extremely high listing error rates of 11.79 and 6.15 percent, respectively. In fact, these two areas accounted for 65 percent of the listing errors recorded. The crew leaders documented the listing errors into three categories: (1) missing or incorrect block number, (2) missing or incorrect street name, and (3) all other errors. Over 50 percent of the errors were classified under "Other."

A major objective of the QA plan was to provide constant and accurate feedback to enumerators enhancing their performance throughout the operation. The data suggested that this feedback policy helped to improve the quality of enumerators' work by about 55 percent.

## Data Collection Operations

**Telephone assistance**—The Census Bureau had three reasons for conducting the telephone assistance operation: (1) to assist the respondents by answering questions regarding the questionnaire; (2) to fill out the questionnaire over the telephone, if the questionnaire identification number could be provided and the respondent insisted; and (3)

to inform the respondent that an enumerator would come to his or her household to complete the questionnaire, if the questionnaire identification number could not be provided. A QA plan daily monitored a sample of telephone calls for a sample of clerks to measure the effectiveness of the telephone assistance operation. A sample of eight telephone assistance clerks, per telephone assistance unit/subunit, per shift, per day were selected for monitoring. Four supervisor-selected clerks were identified first and then four clerks were selected randomly. The clerks selected by the supervisor were chosen based on the clerks' deficiencies suspected by the supervisor. For each clerk selected, four telephone calls were monitored at random for the day and shift. The monitors rated the performance (i.e., proper introduction, questions answered properly, and speech quality) of 2,900 telephone assistance clerks on a scale of 1 (poor) to 5 (excellent). Over all processing offices, there were approximately 2.2 percent below satisfactory ratings and 88.8 percent above satisfactory ratings.

The QA plan for telephone assistance was subjective in nature. The subjectivity of the plan made it difficult to measure its impact on the operation. However, it helped identify those clerks who had problems with assisting respondents.

**Clerical edit**—The Bureau designed a QA check to provide information on the frequency and types of errors made on mail-return questionnaires to ensure all recorded information was clear and complete. The questionnaires were clustered into work units consisting of a maximum of 30 long-form or 100 short-form questionnaires each. From each unit a sample (the sampling rate was 10 percent during the first 10 days of the operation, and later reduced to 2 percent for short forms and 3.3 percent for long forms) of questionnaires was selected for verification of detected errors, such as an item being edited incorrectly or not being edited when it should have been, etc. A total of 120 clerks (i.e., 1 clerk from each of the 120 sample district offices) were selected using simple random sampling to estimate the error rate for the entire operation. The overall weighted estimated incoming error rate was approximately 7.4 percent. Errors committed by edit clerks were of three types: (1) erase, (2) fill, and (3) followup with estimated error rates of 2.5, 3.7, and 4.5 percent, respectively. An erase error occurred if an edit clerk failed to erase stray marks or write-in answers which crossed two or more FOSDIC circles. A fill error occurred if an edit clerk failed to fill an item, such as the "ED" box in the "For Census Use" area. A followup error occurred if an edit clerk failed to circle the question number for any housing or person question which was not properly answered by the respondent.

The purpose of the QA plan was to estimate the quality of the operation, determine and correct source(s) of errors, and provide information useful for giving feedback to the edit clerks. The QA plan fulfilled these goals. The operational error rates and learning curve showed a general decrease in error rates over time. This implied that feedback was given and performance improved.

**Nonresponse followup reinterview**—The Bureau conducted NRFU operations in mail-back areas (covered by 447 district offices) to obtain census information from households that did not return a questionnaire. The NRFU enumerators interviewed individuals in more than 34 million housing units between April 26, 1990, and July 27, 1990. The Bureau instituted a reinterview program to detect data “falsification” by NRFU enumerators. Census staff sampled completed questionnaires using random and administrative sampling methods, reviewed the sample questionnaires, and reinterviewed the corresponding housing units. Based on data from the reinterview program, it was estimated that NRFU enumerators intentionally provided incorrect data for 0.09 percent of the housing units (i.e., between 20,000 and 42,000 NRFU questionnaires were fabricated). The degree of reported fabrication was stable across the country; however, the estimated falsification rate in suburban areas was much lower (0.05 percent) than in metropolitan areas (0.13 percent).

## Data Capture/Processing Operations

### Edit review

**Split**—After the Bureau filmed the questionnaires, ran them through FOSDIC, and edited the resulting machine-readable file by computer, edit clerks sorted (or “split”) the questionnaires into four categories: (1) accept, (2) Post Enumeration Survey (PES), (3) repair, and (4) markup.<sup>33</sup> The Bureau implemented a QA plan for the split operation between March 28 through December 28, 1990. The operation took place in all seven processing offices. The purpose of the QA plan was to (1) identify the causes of errors and provide feedback to the clerks to improve the subsequent quality of the split operation, and (2) identify the batches that failed the quality criteria in order to rectify these batches. A “critical” error occurred when a clerk placed a questionnaire in an incorrect pile (i.e., one of the four piles mentioned above) such that the error could not be corrected or it adversely affected the PES. A “non-critical” error occurred when a questionnaire was placed in an incorrect pile, but the error could be corrected in a subsequent operation.

The error rates were estimated from 100-percent inspection. The overall critical and total estimated error rates for all questionnaires were very low, 0.20 and 0.34 percent, respectively. For short-form questionnaires, the critical and total error rates were 0.20 and 0.32 percent, respectively. For long-form questionnaires, the critical and total error rates were 0.21 and 0.42 percent, respectively, higher than the short-form error rates.

The split operation processed 122,446,453 questionnaires; 99.3 percent of the questionnaires were split correctly, 0.2 percent resulted in a critical error, 0.1 percent in a noncritical error, and 0.4 percent (i.e., 471,249) were classified as missing.

The QA results for this operation recommended that, for any similar operation in the future, new clerks be trained to replace clerks who had split 50,000 questionnaires. The critical quality learning curve indicated that learning ceased and quality deteriorated after a clerk had split about 50,000 questionnaires.

**Markup**—The markup operation and its associated QA plan took place in six of the seven processing offices (the Kansas City processing office was the exception) from March 26 through October 6, 1990. Edit review markup was a clerical operation which reviewed questionnaires that were completed and mailed in by respondents or completed by enumerators during NRFU and failed the automated edits for coverage or content. The QA plan ensured that the clerks were performing the operation as intended, identified areas of difficulty, and provided feedback to assist the clerks and improve the process. A clerk qualified to work on the operation if his/her error rate was less than 5 percent on either of the first two work units completed. (A work unit had a variable number of short and long forms. If there were more than 30 short forms or 10 long forms in a work unit, a sample of 30 short forms and 10 long forms were selected for qualification). The overall estimated incoming and outgoing error rates for all questionnaires for the markup operation were both 1.3 percent. There were no statistically significant differences among the six processing offices. The overall estimated error rates for short- and long-form questionnaires were 2.2 and 1.0 percent, respectively.

The QA plan fulfilled its purpose. The individual learning curve showed that learning took place and estimated error rates for clerks decreased steadily over time. This implied that feedback on types of errors was given to clerks on a timely basis and resulted in improved quality.

**Telephone followup**—For the telephone followup operation, clerks telephoned a questionnaire respondent to obtain omitted information or to clarify existing responses. This operation was implemented for 24 weeks and was done in both and processing offices. However, the QA plan was applied only in the latter. The QA plan consisted of two parts—a monitoring process and a resolution process. The monitoring process, implemented in all processing offices except Kansas City, was used to determine how clerks conducted themselves on the phone. The goal was to identify the problems and provide feedback to improve their performance. The resolution part was to evaluate clerks based on how well they resolved items marked for followup. The primary goal was to determine abnormally high or low rates of unresolved actions and provide feedback as appropriate.

The QA plan used a sample independent verification scheme. The processing offices sent a 20-percent sample of all completed quality assurance monitoring and resolution forms to headquarters. From that sample, 110 forms were selected for analyzing the monitoring operation and 100 forms for the resolution operation per PO. The quality

<sup>33</sup>For more detail, see chapter 8.



levels of all monitoring characteristics were measured on an ordinal measurement scale of 1 to 5. The below satisfactory total included both 1 (poor) and 2 (fair) ratings. The above satisfactory total included both 4 (good) and 5 (excellent) ratings. Overall, the monitoring clerks issued approximately 3.9 percent below satisfactory ratings, and 78.8 percent above satisfactory ratings. At the Bureau's headquarters, the sampled monitoring QA data were used to determine the distribution of ratings for three characteristics: (1) proper introduction, (2) questions asked properly, and (3) quality of the clerks' speech. Some processing offices did not rate each characteristic for every call probably because the clerk did not get a chance to talk to the respondent who decided not to answer the question(s). Of the three characteristics, the one with the most below satisfactory ratings was "proper introduction" (approximately 44.4 percent of all the below satisfactory ratings).

Overall, the QA monitoring and resolution processes went well. However, there were problems with the monitors/supervisors not completing the quality assurance forms as instructed in the procedures. For the monitoring portion of the telephone followup operation, supervisors appeared to have given feedback to the clerks as needed. The QA plan for the resolution portion helped determine which clerks were not getting answers for all unresolved edit actions and how many and which questions were being refused by the respondent(s). Positive and negative feedback was provided by the monitors in a timely manner.

**Repair**—The questionnaire repair operation and its associated QA were scheduled to last from April 2 through December 18, 1990; however, records were received with dates from March 26 to December 27, 1990. The operation took place in all seven processing offices. Repair was the clerical operation that reviewed all questionnaires that failed a limited automated edit due to a FOSDIC misread or identification number problem. The associated QA plan monitored the clerks by examining a sample of questionnaires daily. The purpose of the plan was to ensure that the clerks were performing the repair operation as intended by identifying areas where they were having difficulties and providing feedback on problems identified. The QA plan also identified extremely poor quality work that needed to be redone. Qualification of a clerk to work on the repair operation was based on "live" work units. A work unit consisted of all questionnaires from a camera unit that were sent to the repair unit. If a work unit contained 50 or fewer questionnaires either short or long form, all questionnaires in that work unit were verified. If there were more than 50 questionnaires in a work unit, a sample of 50 questionnaires was selected for qualification. A clerk qualified if his/her error rate was less than 10 percent on either of their first two work units.

The overall estimated incoming error rate for the repair operation was 2.5 percent. The rates ranged from 1.4 percent (Baltimore) to 5.0 percent (Albany). The overall estimated error rates for short- and long-form questionnaires across all seven processing offices were 2.4 and 3.0

percent, respectively. The QA plan for the repair operation fulfilled its purpose. The learning curves showed that learning took place and that estimated error rates for clerks decreased steadily over time.

**Industry and occupation coding**—Coding of write-in responses to industry and occupation items was first attempted by the automated coder at headquarters. If the automated coder assigned codes to both the industry and the occupation item, the case was complete and left the processing flow. Cases not completed by the automated coder were sent for clerical coding at the Kansas City PO. Clerical coding operated on two levels—residual and referral coding. For residual coding, coders used the 1990 Alphabetical Index of Industries and Occupations and Employer Name Lists as references for assigning codes. If residual coders were unsuccessful in coding an item, the case went to referral coding where coders assigned the final code using additional reference materials. The referral rate for industry items was higher than that for occupation items.

A three-way independent verification was used to monitor the quality of both computer and clerical coding. Samples selected from computer coded, residual coded, and referral coded cases were copied to create "test decks" to be used as QA cases. These copies were distributed among work units assigned to different coders, then matched and compared. Three possible results were (1) three-way agreement, i.e., all codes the same, (2) three-way difference, i.e., all codes different, and (3) minority/majority situation, i.e., two codes the same, one different. Error rate was defined as the number of coding "errors" divided by the number of coding actions. An item in the sample was "incorrect" if it was the minority code. The other two codes in a minority/majority situation were said to be correct. A significant portion of the minority codes (23.0 percent of industry and 17.4 percent of occupation) were referral codes.

With respect to quality measures, the day and night shifts performed similarly (i.e., coded items with the same consistency), but the night shift had a notably higher production rate (89.06 items per hour) than the day shift (76.30 items per hour). The quality of industry and occupation coding operation was much better in 1990 than in 1980. The success was primarily due to the automated coder and the Computer Assisted Clerical Coding System.

**General and 100-percent race coding**—The general and 100-percent race coding operation assigned numeric codes to write-in responses from the short- and long-form questionnaires keyed into computer files. General coding covered the ancestry, race, language, Spanish/Hispanic origin, and relationship items from the long-form questionnaire; 100-percent race coding dealt with the responses to the race item on the short-form questionnaire. Each unique write-in was compared to coded write-ins in the corresponding master file. The unmatched entries were manually coded using a semi-automated process. A sample of each coder's work was selected for dependent verification that

monitored the coding process. All of the first 1,000 codes assigned by a coder were verified by another coder, usually the coding supervisor. After the first 1,000 codes, a 5-percent sample was verified. The measure of coding quality (called "differences") was divided into three categories—nonsubjective, subjective, and procedural change type differences. A difference was not the same as an error. While a nonsubjective difference was likely to indicate that an error was made either by the coder or the verifier, a subjective difference reflected only that the verifier would have assigned a different code, not that the code assigned was inappropriate. The difference rates were estimated using the Horvitz-Thompson estimator. The difference rates were 1.47 percent for ancestry, 1.90 percent for language, 0.74 percent for relationship, 3.95 percent for race on the short form, 3.60 percent for race on the long form, and 1.16 percent for Spanish/Hispanic origin.

The 1990 general and 100-percent race coding operations were extremely successful. All of the race write-ins (in addition to the other general coding items) were coded, marking the first time that write-in responses were coded on both short- and long-form questionnaires.

**Place-of-birth, migration, and place-of-work coding**—The operation assigned numeric codes to keyed write-in responses to the place-of-birth, citizenship, migration, place-of-work, and employer questions on the long form. Identical write-in responses to place-of-birth, migration, and place-of-work questions were grouped into clusters. Computer codes assigned with high level of accuracy were referred to as "machine coded." The place-of-work/block responses were not clustered until after machine coding. Clerical coding was performed by the DPD staff in Jeffersonville, IN, and the Field Division staff in Charlotte, NC. Clerical coding operated on two levels—production and referral coding; both were semi-automated processes (For more details on place-of-birth, migration, and place-of-work coding, see chs. 3 and 8).

The QA plan involved three aspects—training/qualification, verification, and quality circle meetings. Coders were trained and tested before they were assigned to code actual census information. During production, each coder was monitored. The overall estimated error, referral, and three-way difference rates for the place-of-birth computer-assisted clerical coding operation were 4.1, 7.7, and 0.8 percent, respectively. The overall estimated error, referral, and three-way difference rates for the migration computer-assisted clerical coding operation were 7.3, 19.9, and 1.7 percent, respectively. The overall estimated error, referral, and three-way difference rates for the place-of-work/place computer-assisted clerical coding operation were 3.0, 13.5, 0.5 percent, respectively; for place-of-work/block, the rates were 8.8, 57.0, and 2.5 percent, respectively.

The Bureau developed the QA plan to ensure that the 1990 computer assisted clerical coding system operated under a process control system. The QA plan improved the quality of the coding production system over time. However, there was no convincing evidence of a correlation

between test deck scores and production error rates for all of the operations. Ideally, test deck error rates should be correlated positively and strongly with later production error rates.

## Data Keying

**Race write-in**—In 1990, respondents had the option of selecting one of the specific race categories listed on the questionnaire or entering a write-in answer to identify an American Indian tribe or an Other Asian/Pacific Islander race not listed. Keyed race responses were assigned numeric codes for inclusion in the 100-percent edited detail file. The race write-in keying operation was performed at each of the seven processing offices and lasted from May 16, 1990, through December 31, 1990. During this period, approximately 15,245,991 race write-in entries were keyed from 5,404,102 short-form questionnaires. The DSSD designed the QA plan for this operation to detect and correct keying errors, to monitor the keying, and to provide feedback to the keyers to reduce further errors.

The QA plan involved two-stage quasi-independent sample verification, first on the batch level, then on the within-batch or questionnaire level. The questionnaire sampling rate within each batch was determined by the number of questionnaires with race write-in entries. If the number of questionnaires with race entries was less than or equal to 40, all keyed questionnaires were verified. If the number was greater than 400, 10 percent of the keyed questionnaires were verified. The first 30 batches for each keyer were verified. If a keyer's sample field error rate for these 30 batches did not exceed 2.5 percent, then a 20 percent sample of batches was selected for verification thereafter. If the error rate exceeded 2.5 percent at any time, then all batches completed by that keyer were verified. Based on the QA sample, 25 percent of the race write-in entries were in the American Indian category and 75 percent were in the "Other" category. It was estimated that the keyers committed keystroke mistakes or omissions in 0.51 percent of the fields keyed. Analysis of the keyers' performance revealed that error rates declined over time. This decline represented a "learning curve" that could be attributed to feedback and experience.

**Long form**—In 1990, a sample of 1-in-6 housing units was selected to receive long-form questionnaires. These questionnaires required much more detailed respondent information than the short-form questionnaires, and many of the data collected were write-in entries. DSSD designed the QA plan to detect and correct keying errors, to monitor the keying, and to provide feedback to the keyers to prevent further errors. For batches with 30 or more long forms, a systematic sample of 1 in 15 long forms (6.67 percent) were selected for verification. For batches with fewer than 30, a random sample of 2 was selected. A verifier keyed each field on a sample questionnaire and matched it to the corresponding keyer entry. It was estimated that the keyers committed keystroke mistakes or omissions in 0.62 percent

of the fields keyed. All processing offices performed similarly except for Jeffersonville and Baltimore which had the highest error rates at 0.85 and 0.81 percent, respectively, and Kansas City had the lowest error rate at 0.32 percent. Overall, the quality of keying was very good. The QA plan was successful in facilitating improvement in the keying over the course of the operation by identifying sources of error and providing prompt feedback to keyers.

**1988 prelist**—During the 1988 prelist operation, census enumerators listed and map spotted addresses in prelist areas (e.g., suburban areas, small cities, towns, and some rural areas). The keyed prelist addresses were used to update the master address file for the purpose of delivering census questionnaires. The 1988 prelist keying operation took place in the Baltimore and Kansas City processing offices. A QA plan was designed by DSSD to detect and correct keying errors, to monitor keying, and provide feedback to the keyers to prevent further errors. A 10-percent systematic sample was selected for verification from each keyed address register containing at least 100 addresses. For registers with fewer than 100 addresses, all (100 percent) were verified. The verifier keyed all numeric fields and the street name field in the appropriate address. An exact match was required. The QA plan estimated that 0.48 percent of the fields were keyed in error. This represented a 52 percent improvement over the 1988 Dress Rehearsal field error rate of 1.0 percent. It was estimated that 0.35 percent of the fields on the prelist file contained a "critical error" and these fields affected 1.30 percent of the addresses on the prelist file. (In this evaluation, a critical error occurred when the keying differences were significant enough to misrepresent the original field information. This type of error could affect the deliverability of the census questionnaire to the address or cause difficulty in locating the address during followup activities). This indicated that approximately 362,647 addresses in prelist areas could have had difficulty in receiving census mail. The QA plan for the 1988 prelist keying operation was successful. The field error rate dropped throughout the operation.

**Precanvass**—The prec canvass operation was performed in urban and major suburban areas to verify the accuracy and completeness of the address lists obtained from commercial vendors after they had been updated through a post office check. The updates were keyed at the Baltimore, Jacksonville, Kansas City, and San Diego processing offices. During the QA operation, every keyed address register was verified. Within each address register, a random sample of 20 addresses from each action code was selected for verification. Action codes indicated the status of an address, such as add, delete, correction, etc. If the register contained fewer than 20 addresses with a particular action code, all addresses with that code were verified. The overall pre-verification field error rate was 0.17 percent and the post-verification field error rate was 0.08 percent. One goal of the QA plan was to minimize differential undercoverage and reject unacceptable work

(i.e., registers with high rate of field errors). Overall, the quality of the keying was very good, and the QA plan was successful in facilitating improvement in keying over the course of the operation.

**Collection control file**—During the 1990 census, enumerators at the 449 district offices across the country checked work out and in daily. This work flow was recorded on forms, and data from these forms were keyed into a collection control file (CCF) (See ch. 6 for more details). A QA plan was designed to detect and correct keying errors, to monitor the keying, and to provide feedback to the keyers to prevent further errors. DSSD selected a sample of 39 district offices from which to receive and analyze data collected during the QA process. Seven of the sixteen operations keyed into the CCF were selected for verification—field followup check-in, group quarters check-in, list/ enumerate check-in, list/enumerate corrections, list/enumerate merge, NRFU check-in, and structuring assignment. All forms for these seven keying operations were 100-percent verified. A total of 53,865 batches were keyed and verified at the 39 district offices. The record error rate for these batches was 1.29 percent, and the field error rate was 0.73 percent.

### Quality Assurance Technician Programs

**Regional Census Centers**—During the data-collection phase of the census, each of the 449 reported to one of the 13 RCC's. The RCC's provided general administrative and technical support and monitored the general progress and proper implementation of the programs in their specific regions. An RCC quality assurance technician program was developed and implemented. From February 1 to August 31, 1990, 1 person in each of the 13 RCC's monitored QA requirements for 7 field operations in the areas of field enumeration (i.e., list/enumerate, update/leave, and urban update/leave), office processing (e.g., clerical edit and collection control file keying), and falsification detection (in list/enumerate and NRFU operations).

The objective of the QA plan was to promote management awareness of the purpose and importance of the various quality programs and to monitor the adherence to the QA procedures. To meet this goal, each RCC QA technician participated in the RCC management meetings and acted as a consultant to management for QA matters. In monitoring compliance with the QA requirements by the district offices, the technician used administrative analysis, independent investigation, and personal observation. The data obtained by the weekly administrative analysis suggested that 12 of 13 regions performed some level of monitoring. Within the 12, only about 30 percent of each requirement was monitored as expected. The urban update/leave operation experienced the highest overall monitoring coverage rate, 63.12 percent. The high rate could have been due to the short duration of the operation and fewer QA requirements. No other field operation experienced an overall coverage rate of administrative analysis in excess

of 50 percent. The list/enumerate operation experienced the lowest coverage rate, 22.07 percent. Two possible explanations existed for this low rate: (1) there were no records to indicate that the QA requirements were monitored in 3 of the 10 regions performing the list/enumerate operation and (2) the late start and longer than expected duration of the operation due to bad weather in some regions.

The RCC QA technician program generally accomplished its objectives. The implementation of the QA program within the district office was monitored, problems were identified, and referred to the RCC's and district offices management for resolution. However, communication between the technicians and QA analysts at headquarters was hampered by the lack of direct communication links. All communication was channeled through an intermediary group, reducing both the timeliness and the effectiveness of communication.

**Processing offices**—During the data-processing phase of the census, the Bureau established seven processing offices in Albany, NY; Austin, TX; Baltimore, MD; Jacksonville, FL; Jeffersonville, IN; Kansas City, MO; and San Diego, CA. Each office checked in census questionnaires, filled in control information on questionnaires for microfilming, actually microfilmed and did data keying, and other administrative works. The processing office QA technician program was developed to measure the quality of performance as well as provide information on the type and source of errors to improve performance. The objectives of

the QA plan were the same as those for the RCC QA plan. From the QA technicians' perspective, the PO QA program was successful in monitoring the operational compliance of quality assurance requirements. Most of the QA requirements were implemented properly; however, most of the QA requirements that caused difficulties could have been minimized by clarifying procedures, enhancing supervisor training, and reaching a consensus between processing offices and headquarters management on such quality concepts as rotation of personnel, use of feedback, qualification of workers, etc.

**Printing**—For the 1990 census, the Bureau produced approximately 107 million enumerator-administered questionnaires and 112 million questionnaire mailing packages at about 20 contractor sites. The contracts contained strict and concise printing requirements. The QA technician program was developed to monitor the contractors' adherence to QA requirements. The technicians were trained in the classroom at Census Bureau headquarters and the GPO. The technicians verified the selection and inspection of the QA samples, detected and observed the corrective action taken on defective material, ensured recordkeeping of the QA data, and investigated problems and reported observations conflicting with the QA requirements. The QA program was very useful for monitoring the production of the questionnaire packages. The presence of the technicians at the contractor sites had a positive impact on the quality of the materials produced.

# APPENDIX 11A.

## Selected 1990 Census Preliminary Research and Evaluation Memorandums (PREM) Used in the Preparation of this Chapter

| Number | Date     | Prepared by   | Subject  |
|--------|----------|---|--|
| 68     | 12/31/91 | Arjun Adlakha, Howard Hogan,<br>and J. Gregory Robinson<br>Statistical Support Division | Preliminary Final Report for PES Evaluation<br>Project P17: Internal Consistency of Estimates  |
| 74     | 09/22/91 | J. Gregory Robinson<br>Population Division  | Demographic Analysis Evaluation Project D1:<br>Error in the Birth Registration Completeness<br>Estimates   |
| 75     | 09/22/91 | Karen A. Woodrow<br>Population Division   | Demographic Analysis Evaluation Project D2:<br>Preliminary Estimates of Undocumented<br>Residents in 1990  |
| 76     | 09/22/91 | J. Gregory Robinson<br>Population Division  | Demographic Analysis Evaluation Project D3:<br>Uncertainty Intervals for Estimated White<br>Births, 1915 to 1934                                     |
| 77     | 09/22/91 | J. Gregory Robinson<br>Population Division  | Demographic Analysis Evaluation Project D4:<br>Uncertainty Intervals for Estimated Black<br>Births, 1915 to 1934                                     |
| 78     | 09/22/91 | Karen A. Woodrow<br>Population Division   | Demographic Analysis Evaluation Project D5:<br>Preliminary Estimates of Emigration<br>Component  |
| 79     | 10/22/91 | J. Gregory Robinson<br>Population Division  | Demographic Analysis Evaluation Project D6:<br>Robustness of the Estimates of the Population<br>Aged 65 and Over                                     |
| 80     | 12/04/91 | J. Gregory Robinson, Karen A.<br>Woodrow, and Bashir Ahmed<br>Population Division       | Demographic Analysis Evaluation Project D7:<br>Uncertainty Measure For Other Components  |
| 81     | 09/21/91 | J. Gregory Robinson<br>Population Division  | Demographic Analysis Evaluation Project D8:<br>Uncertainty for Models to Translate 1990<br>Census Concepts into Historical Racial<br>Classifications |
| 82     | 10/22/91 | J. Gregory Robinson<br>Population Division  | Demographic Analysis Evaluation Project D9:<br>Inconsistencies in Race Classifications of the<br>Demographic Estimates and the Census                |
| 83     | 12/04/91 | Bashir Ahmed and<br>J. Gregory Robinson<br>Population Division                          | Demographic Analysis Evaluation Project D10:<br>Differences Between Preliminary and Final<br>Estimates of Percent Net Undercount                     |
| 84     | 10/22/91 | Prithwis Das Gupta<br>Population Division   | Demographic Analysis Evaluation Project D11:<br>Models for Assessing Errors in Undercount<br>Rates Based on Demographic Analysis                     |
| 96     | 11/07/91 | William Bell<br>Statistical Research Division   | Using Information from Demographic Analysis<br>in Post-Enumeration Survey (PES) Estimation -<br>New Methods and Further Results                      |

| Number | Date     | Prepared by  | Subject   |
|--------|----------|--|---|
| 97     | 10/31/91 | Nancy Bates Center for Survey Methods Research and David C. Whitford Decennial Planning Division | Reaching Everyone: Encouraging Participation in the 1990 Census   |
| 99     | 10/28/91 | Somonica L. Green and Michael L. Mersch Statistical Support Division                             | Quality Program and Results of the Creation of the Short-Form Mailing Packages for the 1990 Decennial Census                  |
| 103    | 12/09/91 | Somonica L. Green Statistical Support Division   | Quality Assurance Results of the Initial Short-Form Mailing Package Production for the 1990 Decennial Census                  |
| 104    | 12/09/91 | J. Gregory Robinson, Bashir Ahmed, Prithwis Das Gupta and Karen Woodrow Population Division      | Estimating Coverage of the 1990 United States Census: Demographic Analysis  |
| 108    | 12/09/91 | Nancy Bates Center for Survey Methods Research   | The 1990 Alternative Questionnaire Experiment: Preliminary Report of the 100-percent Items                                    |
| 115    | 01/27/92 | Michelle Roberts Statistical Support Division  | 1990 Post Enumeration Survey Quality Assurance Results from the Preparation of Followup Forms                                 |
| 138    | 04/01/92 | Somonica L. Green Statistical Support Division   | Quality Assurance Results of the Initial Long-Form Mailing Package Production for the 1990 Decennial Census                   |
| 146    | 05/07/92 | Nancy Bates Center for Survey Methods Research   | Additional Results From the 1990 Alternative Questionnaire Experiment   |
| 165    | 07/10/92 | Mary Mulry Decennial Statistical Studies Division  | 1990 Post-Enumeration Survey Evaluation Project P16 Total Error in PES Estimates for Evaluation Post Strata                   |
| 179    | 09/15/92 | Deborah Griffin and Chris Moriarity Decennial Statistical Studies Division                       | Characteristics of Census Error   |
| 183    | 10/13/92 | Kirsten K. West and Mary H. Mulry Decennial Statistical Studies Division                         | The Reinterview Evaluation of the 1990 Post Enumeration Survey  |
| 188    | 10/13/92 | Somonica L. Green Decennial Statistical Studies Division   | Comparison of the Short and Long-Form Mailing Package Production Quality for the 1990 Decennial Census                        |
| 193    | 10/21/92 | Danny R. Childers Statistical Research Division  | The 1990 Housing Unit Coverage Study  |
| 196    | 10/22/92 | Jeffrey S. Corteville Decennial Statistical Studies Division                                     | Quality Assurance Evaluation of the 1990 PES Interviewing Operation   |
| 240    | 07/23/93 | Chris Moriarity Decennial Statistical Studies Division   | Characteristics of Census Error Additional Results  |
| 246    | 08/10/93 | Somonica L. Green Decennial Statistical Studies Division   | Evaluation of the Quality Assurance Technician Program for the Production of the 1990 Decennial Census Questionnaire Packages |
| 248    | 08/25/93 | Yukiko Ellis Decennial Statistical Studies Division  | Census Error Study  |
| 251    | 09/29/93 | Danny R. Childers and Christopher Moriarity Statistical Research Division                        | Analysis of Census Omissions: Preliminary Results   |

| <b>Number</b> | <b>Date</b> | <b>Prepared by</b>                                       | <b>Subject</b>  |
|---------------|-------------|--|---|
| 253           | 10/07/93    | Danny R. Childers<br>Statistical Research Division       | Coverage of Housing in the 1990<br>Decennial Census   |
| 267           | 01/26/94    | Yukiko Ellis<br>Decennial Statistical Studies Division   | Census Error Study                                    |
| 273           | 10/07/94    | Yukiko Ellis<br>Decennial Statistical Studies Division   | Categorical Data Analysis of Census<br>Omissions      |
| 275           | 11/25/94    | Susan C. Wajer<br>Decennial Statistical Studies Division | Final Results From 1990<br>Coverage Sampling Research |



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## Chapter 12. Legislation and Litigation

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# CHAPTER 12.

## Legislation and Litigation

### INTRODUCTION

The United States Constitution empowers the Congress to carry out the census in "such manner as they shall by Law direct" (Article 1, Section 2). Congress passed special acts for the first 14 censuses (1790 to 1920) with detailed provisions on how to take the census and what questions to include. In 1929, Congress passed the Permanent Census Act under which the 1930 Decennial Census was taken. This Act gave the Secretary of Commerce (and by Secretarial delegation, the Director of the Census Bureau) substantial discretion in determining the questions and procedures. Modifications to the 1929 Act and later legislation to provide for the census of housing governed the 1940 and 1950 censuses. In 1954 Congress codified these and all other Census Bureau statutes as Title 13, United States Code, which permanently authorized the agency's censuses and other statistical programs. Title 13 was amended several times over the ensuing years and governed the 1990 census. (See app. 1A to ch. 1 of this *History* for pertinent sections.)

This chapter reviews key provisions of Title 13, recent laws affecting the 1990 census, and various aspects of congressional oversight. Next, the chapter focuses on the 1990 census-related lawsuits and their eventual outcome. Twenty-two cases (filed between 1988 and 1994 against the Census Bureau and/or the Department of Commerce) challenged one or more 1990 census policies or procedures. (Appendix 12B provides a list of the principal plaintiffs, issues under litigation, and other pertinent information for each lawsuit.) Among the plaintiffs' concerns were the Secretary of Commerce's decision concerning adjustment of the 1990 census population counts; release of the adjusted, block-level data; the apportionment formula used to determine the number of Representatives allocated to each State; residence rules used by the Census Bureau to decide who to count and where to count them; the inclusion of undocumented aliens in the census figures used for apportionment; the design, implementation, and results of the "Shelter and Street Night" operation;<sup>1</sup> and the accuracy of sample data from the long-form questionnaires.

<sup>1</sup>Shelter and Street Night (S-Night) was a census operation that took place during the evening hours of March 20 and the early morning hours of March 21, 1990. It was designed to count persons living in pre-identified public shelters (including those for abused women) and places of commerce such as bus or train stations, and persons visible on the streets. For a description of the program, see ch. 6 of this *History*.

### Title 13, United States Code

Title 13 does not specify which subjects or questions are to be included in the decennial census. It does require the Census Bureau to notify Congress of general census content 3 years before, and the actual question wording 2 years before, the decennial census. The law also directs that State population counts for apportionment purposes be delivered to the President of the United States within 9 months of Census Day (currently, April 1 of the year in which the census is taken).

Title 13 requires individuals to complete (or provide information for) the census questionnaire and participate in other phases of the census as the Census Bureau deems necessary. These other activities could include providing information about a housing unit's address and number of living quarters, participating in test and dress-rehearsal censuses, answering decennial-related research surveys, or responding to post-census questionnaires used to evaluate decennial census coverage. According to Section 221, Title 13, anyone 18 years of age or older who willfully neglects or refuses to answer the census may be fined up to \$100. Anyone who knowingly gives false answers is subject to a fine of \$500.

Title 13 also mandates strict confidentiality of the information gathered.<sup>2</sup> Section 9(a) states in part:

Neither the Secretary, nor any other officer or employee of the Department of Commerce or bureau or agency thereof may...

- (1) use information furnished under the provisions of this title for any purpose other than the statistical purposes for which it is supplied; or
- (2) make any publication whereby the data furnished by any particular establishment or individual under this title can be identified; or
- (3) permit anyone other than the sworn officers and employees of the Department or bureau or agency thereof to examine the individual reports.

Every permanent and temporary employee of the Census Bureau takes an oath to protect the confidentiality of census information. Employees are subject to a fine of up to \$5,000 and/or 5 years imprisonment for wrongful disclosure.

<sup>2</sup>In 1994, the Congress amended Title 13 to permit the Census Bureau to share address information with State and local governments for the sole purpose of updating decennial census address lists. State and local officials may not use this address information for noncensus purposes, such as taxation or law enforcement.

Individual census records are by law (Title 44, United States Code) confidential for 72 years after collection. The National Archives and Records Administration then may open them to the general public for genealogical and other uses. However, many people have to rely on later records (i.e., 1930 on) of their ancestors' or their own census answers to prove age, residency, and/or identity. The Census Bureau (under the authority of Title 13, Section 8) may release information from these records, but only to the named persons, their authorized representatives, or their legal beneficiaries upon proof of death.

## LEGISLATION

### Congressional Oversight and Appropriations Activities

During the 1990 census period, the Census Bureau came under the jurisdiction of the House Committee on Post Office and Civil Service's Subcommittee on Census and Population (renamed the Subcommittee on Census, Statistics and Postal Personnel in 1993) for oversight purposes. On the Senate side, the Governmental Affairs Subcommittee on Government Information and Regulation (renamed the Subcommittee on Regulation and Government Information in 1993) oversaw the Census Bureau. Prior to this, the Senate subcommittees with this responsibility were Federal Services, Post Office, and Civil Service (1987-88) and Energy, Nuclear Proliferation, and Governmental Processes (1983-86). (Appendix 12A lists the oversight subcommittee members from the 98th to the 103rd Congresses (1983-94).)<sup>3</sup>

Between 1983 and 1993, congressional oversight of the Bureau's activities fell primarily to the committees noted above. The General Accounting Office (GAO), an arm of the Congress, evaluated and observed Census Bureau activities, often reporting to the committees on specific topics of interest. Among the topics on which the GAO reported were early planning for the census, questionnaire content, questionnaire length, automation plans, procurement, coverage improvement programs, recruitment, adjustment of the census counts, and the need for fundamental reform.

In the House of Representatives, the Census Bureau's appropriations were handled by the Subcommittee on Commerce, Justice, State, the Judiciary, and Related Agencies, one component of the Committee on Appropriations. In the Senate, the Bureau's appropriations came before the Subcommittee on Commerce, Justice, State, and Judiciary of the Committee on Appropriations. Money

<sup>3</sup>The 104th Congress instituted major reforms in the number and jurisdiction of the various congressional committees. In 1995, oversight responsibility for the Census Bureau in the House of Representatives shifted to the Subcommittee on National Security, International Affairs, and Criminal Justice of the Committee on Government Reform and Oversight.

to operate Federal agencies must be appropriated annually, so for each year in the 1990 census cycle, there was a separate law appropriating the Bureau's funding.

### Review of House and Senate Oversight Hearings

One of the most important functions of any congressional oversight committee is to hold open congressional hearings to hear progress reports from the agency being reviewed and to hear from other interested parties. During the 1990 decennial census period, congressional committees or subcommittees held more than 70 hearings related to the 1990 census. More than three-fourths of these hearings were before the House oversight subcommittee, with the remainder conducted by other congressional committees or subcommittees.

Topics of the congressional hearings ran the full gamut of issues related to planning and carrying out a census. In the years 1984-89, the emphasis was on plans to improve coverage in the census, including plans for promotion and for introducing other improvements, such as automation, into the census. There were also hearings on residence rules, plans to enumerate components of the homeless population, questionnaire content, and enumeration plans for specific States and cities. In 1990, the focus turned to the actual conduct of the census and problems with questionnaire delivery, lower-than-expected mail-return rates, recruitment, and coverage improvement operations. In 1991, the committees gave more attention to the process of deciding whether the census counts could or should be adjusted for undercounts or overcounts. In 1992 and 1993, fewer hearings were conducted, and these focused on research and development for the 2000 census and demographic results of the 1990 census.

### Public Laws Concerning the Decennial Census

**Public Law (P.L.) 98-166, Departments of Commerce, Justice and State, The Judiciary and Related Agencies Appropriations Act, 1984 (Nov. 28, 1983)**—Some appropriations acts go beyond merely appropriating funds and contain authorizing language. For example, this FY 1984 Appropriations Act authorized the U.S. Postal Service (USPS) to furnish to the Secretary of Commerce lists of names and addresses requested under Section 6(a) of Title 13 during fiscal year 1984. The Secretary of Commerce was required to report to the President and the Congress before September 1984 on the purposes for which any Postal Service lists were used; the advantages and disadvantages of using Federal and commercial lists; the Bureau's progress in developing an improved list methodology; and measures taken to ensure the confidentiality of any information provided by the U.S. Postal Service.

This legislation enabled the Census Bureau to conduct the 1984 Address List Compilation Test, which examined alternative methods of compiling address lists for the 1990 census. (See ch. 2 for a description of this test.) One

method was to have the USPS compile the list. Before the passage of this law, the USPS could not disclose its address lists to Federal agencies or other entities outside of the postal service. This law granted an exception, so the Bureau could use the USPS-compiled address list in connection with this test.

**P.L. 101-86, Temporary Appointments for the 1990 Census (Aug. 16, 1989)**—This law provided that Federal civilian annuitants or military retirees who accepted temporary appointments for the 1990 census would continue to receive their annuities and other benefits without reduction. The bill applied to jobs lasting up to 180 days and performed before December 31, 1990.

The Census Bureau sought this legislation—and it was strongly supported by both the chair and ranking minority member of the House Subcommittee on Census and Population—to increase the pool of potential, qualified job applicants for temporary census jobs. The Bureau estimated that it would require 480,000 persons to conduct the census and that 315,000 would be needed at the peak of operations (April-June 1990). The agency estimated that this legislation would add 2 million potential applicants to the pool, and, even if only a small fraction of these accepted census jobs, they would greatly enhance the Bureau's ability to meet its hiring needs. The agency also assumed that individuals with experience in government service would bring with them a wealth of administrative and technical skills as well as a knowledge and commitment to serving the public.

**P.L. 101-293, Elimination of Time Limits for Temporary Appointments for the 1990 Census (May 15, 1990)**—This law eliminated the 180-day limit imposed by P.L. 101-86 on the period for which Federal civilian annuitants and military retirees could serve as temporary employees in the decennial census without being subject to reductions in their annuities and other benefits. However, these employees would still be subject to such reductions if they worked past December 31, 1990.

This law enabled the Census Bureau to retain highly qualified temporary employees for an additional period of time. Under the 180-day limit, the Census Bureau was losing staff, many of whom were in key management positions, at a time when staff requirements had increased significantly due to the lower-than-expected mail return rate. The Act became law during the peak of census data-collection operations and contributed to the Census Bureau's ability to retain a highly qualified workforce to complete the national enumeration.

**P.L. 101-302, Dire Emergency Supplemental Appropriation Act (May 25, 1990)**—This appropriations law provided a contingency reserve of \$110 million in new budget authority for the decennial census. The additional funds were to be made available only to the extent that appropriations were insufficient to cover increased field work due

to a lower-than-expected response rate to the questionnaire mailout. The additional funds could also be used to offset unforeseen events such as lower-than-expected employee productivity rates or natural disasters.

The law also stated that work performed by individuals in temporary census positions after April 20, 1990, would not be credited for the purpose of evaluating unemployment compensation claims filed after the conclusion of that work. This provision was intended to save an estimated \$70 million in existing budget authority that the Bureau had set aside for unemployment claims.

**P.L. 101-382, Customs and Trade Act of 1990 (Aug. 20, 1990)**—This law repealed the provision relating to unemployment compensation enacted into law by Public Law 101-302 (see above), so that services performed after April 20, 1990, by temporary decennial census employees again constituted "Federal service" under the unemployment compensation program. As a result, these temporary workers' wages were credited to them in determining their eligibility for unemployment compensation. This law passed after many complaints from these workers to congressional offices about such losses. However, the Census Bureau's Appropriations Subcommittees wrote into subsequent appropriations bills language prohibiting the agency from reimbursing the Unemployment Compensation Trust Fund for 1990 census workers. This created an unfunded obligation for the Trust Fund.

**P.L. 101-524, Deceptive Mailings Prevention Act (Nov. 6, 1990)**—This law designated as nonmailable any mail solicitation by a nongovernmental entity for information, donations, or the purchase of products or services that could reasonably be interpreted or misconstrued as implying Federal Governmental connection, approval, or endorsement. Exceptions to this law included occasions when the mailer had an express connection with the Government, the otherwise objectionable matter was contained in advertising in a publication mailed by other than the advertiser, or the mailed matter carried a conspicuous notice both on the mailing envelope and on the mailed contents disclaiming any connection with or endorsement by the Federal Government.

The Census Bureau and Department of Commerce strongly supported passage of this law. The Census Bureau had received numerous complaints from the public about mailings from private organizations that were presented as materials claiming to be connected with the official 1990 Decennial Census. The Bureau was concerned that such marketing techniques contributed to the number of people who did not respond to the 1990 census; however, the law was enacted too late to benefit the mailout.

## **MAJOR LEGISLATIVE ISSUES THAT DID NOT RESULT IN PUBLIC LAWS**

### **Enumeration of Overseas Federal Civilian and Military Employees**

Until the latter part of July 1989, the Census Bureau had not planned to include overseas military personnel, U.S. Government civilian personnel, or their dependents in the

1990 census counts used for apportionment purposes. In previous censuses, these groups had not been included in the apportionment counts (except for the 1970 census, when overseas military personnel were included). By the summer of 1989, however, there was growing bipartisan congressional support to include these overseas Americans in the apportionment counts.

Nine bills requiring the inclusion of overseas Federal civilian and military personnel and their dependents in the apportionment counts were introduced in either the 100th Congress (1987 and 1988) or the first session of the 101st Congress (1989).

Many of these bills also required the Census Bureau to exclude undocumented immigrants from the census totals, as these two issues (including the overseas military and excluding illegal aliens in the 1990 census) were frequently linked together in debate.

While none of these bills passed either house of Congress, the strong bipartisan support shown for including overseas Federal civilian and military employees and their dependents in the apportionment counts was a factor contributing to Secretary Mosbacher's August 1989 decision to apply the 1990 census residence rules to encompass these people. The Department of Defense (DOD) also strongly believed that its employees should not be excluded from apportionment counts because of their temporary and involuntary residence overseas. The DOD planned to conduct a census of its overseas personnel concurrently with the stateside census. The DOD subsequently dropped this plan and instead provided data on its overseas personnel and their dependents from administrative records. (See ch. 6.)

Another issue that arose was how to assign overseas military personnel to a particular State. DOD military personnel and their dependents constituted nearly 95 percent of the total overseas count in 1990. The Bureau concluded that "home-of-record" data best satisfied the technical and conceptual needs of the census. The agency came to this conclusion after several months of discussion with the DOD about alternatives for developing the military personnel counts and after Congress introduced H.R. 4903 and S. 2675 supporting use of the home-of-record concept. H.R. 4903 passed the House, but the Senate took no action on it or on S. 2675. (The legality/constitutionality of including the overseas population in the apportionment counts and the reliability of the administrative data used to allocate these individuals to particular States became subjects of litigation; see *Massachusetts v. Franklin* below.)

## Questionnaire Content

Congress considered several bills dealing with including or revising particular questions on the census questionnaires. In the 100th Congress, Representative Bonker (D-WA) introduced H.R. 4550 and Senator Harry Reid (D-NV) introduced S. 2499. These bills would have restored several housing questions eliminated from the census questionnaires by the Office of Management and Budget

(OMB). The House version was passed and sent to the Senate Committee on Governmental Affairs. While the Senate did not pass H.R. 4550, it did include some of its provisions as an amendment to H.R. 4432, which is described below.

A pair of bills in the 100th Congress dealt with potential changes to the race question on the census questionnaires. The Census Bureau had announced that, based on its research findings, it planned to reformat some of the answer categories to the race question by instructing Asian and Pacific Islander (API) respondents to write the name of their particular group on the blank line provided on the form. This was a distinct departure from the 1980 format, which listed nine specific API groups on the form, plus a write-in response for groups not individually listed. H.R. 4432, introduced by Congressman Robert Matsui (D-CA), and S. 2444, introduced by Senator Spark Matsunaga (D-HI), were identical bills that required the use of separate response categories for all the API groups listed in the 1980 questionnaires. The bills also required the addition of two more API categories but did not specify what they should be. The House passed H.R. 4432 on September 26, 1988.

H.R. 4432, as amended, passed both the House and the Senate and was presented to President Reagan on October 27, 1988. Although he "pocket-vetoed"<sup>4</sup> the bill on November 8, 1988, the Census Bureau recognized the Asian and Pacific Islander communities' feelings about the race question categories and did not want this issue to interfere with the conduct of the census. Therefore, the Bureau decided to incorporate the specific API race categories used in 1980 in the 1990 question. Furthermore, language in the report accompanying the 1989 appropriations bill for the Department of Commerce (P.L. 100-459) directed the use of the 1980 census format of the race question in 1990 "to the extent possible under time and budget constraints."

## Statistical Adjustment of the Census

No aspect of the 1990 census was more controversial than whether census counts should be statistically adjusted for estimated undercounts and overcounts. (See the litigation section below, pp. 14-28, for a more detailed discussion of this issue and related court cases.) A bill was introduced as early as October 1987 seeking an adjustment of the census counts, and similar bills were introduced in the 100th, 101st, and 102nd Congresses, but none was ever reported out of committee.

## Inclusion of Undocumented Immigrants in the Apportionment Counts

The question of whether undocumented immigrants should be included in the apportionment counts for the 1990 census also generated considerable controversy and

<sup>4</sup>A "pocket veto" is the President's indirect veto of a bill presented to him within 10 days of congressional adjournment by retaining the bill unsigned until Congress adjourns. (Governors and other chief executives take similar actions.)

involved both unsuccessful legislative efforts—freestanding bills as well as amendments to appropriations bills—and a lawsuit (see the discussion of *Ridge v. Verity* below). Congressman Thomas Petri (R-WI) and Senator Thad Cochran (R-MS) introduced bills in the 99th Congress calling for the exclusion of undocumented aliens from the apportionment counts. Congressman Petri and Senator Cochran both represented States believed to have few undocumented immigrants. Four bills were introduced in the 100th Congress. The five key sponsors of these four bills also represented States believed to have few undocumented immigrants: Representatives Petri, Thomas Ridge (R-PA), Barbara Kennelly (D-CT), and Harold Daub (R-NE) and Senator Richard Shelby (D-AL). Congress took no action on any of these bills beyond holding a hearing before the House Subcommittee on Census and Population in June 1988.

At this hearing, the Census Bureau reaffirmed its plans to include undocumented aliens in the apportionment counts and stated its opposition to legislation that would exclude them. In doing so, the agency cited, among other things, the Department of Justice's opinion that it would be unconstitutional to exclude undocumented aliens and also stated that there was no acceptable method for excluding them.

Six more bills or resolutions were introduced in the 101st Congress that would have excluded undocumented immigrants from the apportionment counts. Again, the sponsors were from States with few undocumented immigrants: Congressmen William Goodling (R-PA), Tim Valentine (D-NC), Petri, Ridge, and Senator Shelby. At a hearing in September 1989 on the Ridge bill (HR 2661), the Bureau testified in opposition. The only other bill to see any activity was Senator Shelby's, S. 848. This was incorporated as an amendment to S. 358, the Immigration Act of 1989, which passed the Senate in July 1989. S. 358 eventually became public law, but without the Shelby amendment.

In the fall of 1989, the Senate passed two appropriations bills with the Shelby amendment attached, but the House rejected the amendment both times. These bills were: HR 2991, FY 1990 Appropriations for the Departments of Commerce, Justice, State, the Judiciary, and Related Agencies and HR 2939, Foreign Operations, Export Financing, and Related Programs Appropriations for 1990. In both cases, the Administration sent strongly worded statements to the conference committees opposing language that would exclude undocumented immigrants.

## 1990 CENSUS LITIGATION

As of the time of this writing (mid-September 1995), the Census Bureau and/or the Department of Commerce had been or were defendants in 22 lawsuits related to the 1990 decennial census. The suits covered a broad range of issues, including statistical adjustment and the release of adjusted block-level counts; the current apportionment formula; the planning, implementation, and results of the S-Night operation; various aspects of census enumeration procedures, including application of the Bureau's "usual

residence rules"; the inclusion of undocumented aliens in the census figures used for apportionment; and the accuracy of sample data from the long-form questionnaires.

### Statistical Adjustment and Release of the Adjusted 1990 Census Counts

Whether to adjust the population figures for overcounts and undercounts was the most litigious issue of the 1990 census. Thirteen lawsuits dealt with this issue and/or release of the adjusted redistricting (block-level) data.

**Lawsuits Seeking an Adjustment of the 1990 Census Counts**—The principal lawsuit on this matter, *City of New York v. U.S. Department of Commerce*, was filed in advance of the census itself. On October 30, 1987, the Department of Commerce issued a press release stating that it did not intend to adjust the 1990 census for undercounts and overcounts. As a result of this action, a number of States, counties, cities (including the city of New York), organizations, and individual citizens from the participating jurisdictions filed suit in the U.S. District Court for the Eastern District of New York on November 3, 1988, seeking a reversal of that decision. The defendants were the President, Commerce Department, and Census Bureau officials, among others.

The plaintiffs asserted that a disproportionate undercount of minorities and other disadvantaged groups (and of the States and localities in which members of these groups overwhelmingly resided) in the 1990 census was inevitable. They further argued that as evidence of this inevitability, the Census Bureau had committed itself to a program of undercount research and to the implementation of adjustment-related activities designed to produce corrected census figures, that, if they met certain pre-established standards of reliability, would become the official decennial census data. Thus, plaintiffs claimed that the Department of Commerce's decision to overrule the Census Bureau and quell those activities was arbitrary and capricious and in violation of the Administrative Procedure Act (APA). Furthermore, they alleged that the anticipated undercount in the 1990 census would result in a loss of political representation and Federal funding to the plaintiff jurisdictions and the individual plaintiffs residing in those jurisdictions, thereby violating those individuals' constitutional rights under Article I, Section 2, and the 5th and 14th amendments.

The plaintiffs requested an injunction to preclude the taking of the 1990 census unless it were subject to an adjustment. Specifically, they asked the court to require the defendants to: (1) conduct a "full-scale" post-enumeration survey (PES) in connection with the 1990 decennial census; (2) correct the 1990 census for undercounts or overcounts, using the most accurate correction methods available; and (3) use the corrected population figures for all purposes for which the defendants use decennial census data.

On July 17, 1989, the parties agreed to stay the suit. The agreement stipulated that the plaintiffs would withdraw their motion enjoining the census; in exchange the Department



would undertake a thorough reconsideration of the question of adjusting the 1990 census. The Census Bureau agreed not only to conduct the traditional enumeration, but also a PES and certain other adjustment-related planning operations in a manner intended to result in the most accurate counts practicable. An adjustment would be made if the Secretary of Commerce, in his discretion, determined that doing so would satisfy guidelines developed by the Department for the decision on adjustment. The decision would be made no later than July 15, 1991.

On October 30, 1989, as part of this agreement, the new Commerce Secretary, Robert A. Mosbacher, convened an eight-member special advisory panel to make individual recommendations to him on whether to adjust the 1990 census. The plaintiffs and defendants each selected four panel members.<sup>5</sup>

Barbara Everitt Bryant, the Census Bureau's Director, and Michael Darby, Under Secretary of Commerce for Economic Affairs (and Administrator of the Department's Economics and Statistics Administration, which had immediate oversight of the Census Bureau), also made recommendations (see below).

The Department published final guidelines on March 15, 1990,<sup>6</sup> as required by the July 17, 1989, agreement. On April 11, 1990, the plaintiffs challenged the guidelines, stating that they were biased against adjustment, thereby violating the agreement that the defendants address the issue "with an open mind." They requested that the court invalidate the guidelines and issue a declaratory judgment that statistical adjustment of the decennial census would not violate the Constitution or Title 13 (Section 195).

On June 7, 1990, Judge McLaughlin of the U.S. District Court for the Eastern District of New York, approved the guidelines and issued the declaratory judgment that the plaintiffs had requested. However, he stated that the Court reserved judgment regarding the legality/constitutionality of adjustment, depending upon the final form that it took (assuming the Secretary decided in favor of adjustment).

On May 24, 1991, the Department solicited public comment on whether the 1990 census should be statistically adjusted.<sup>7</sup> On June 21, 1991, the Bureau's Undercount Steering Committee submitted its report to Dr. Bryant.<sup>8</sup> This report contained assessments of the adequacy of the PES and demographic analysis as tools for evaluating and adjusting the 1990 census, and evaluated the quality of the adjusted census counts relative to the actual ones. A steering committee majority concluded that statistical adjustment would lead to an improvement in the counts, on average, for higher levels of geography (the Nation, States, and places with populations of 100,000 or more). On the same day, the eight appointed members of the Secretary's special advisory panel sent Secretary Mosbacher their individual recommendations on adjusting; they split—the plaintiffs' four in favor and the defendants' four against. Later in June, Drs. Bryant and Darby presented their recommendations—Dr. Bryant for<sup>9</sup> and Dr. Darby against.<sup>10</sup> Dr. Bryant's report cited the majority opinion of the Undercount Steering Committee that, on balance, the adjusted numbers were more accurate than the unadjusted figures.

The Secretary carefully considered the full range of issues and the diversity of professional opinion among his advisors concerning adjustment of the 1990 census. He evaluated the adjusted counts in terms of the eight guidelines that had been developed as criteria for the adjustment decision. On July 15, 1991, Secretary Mosbacher announced that the 1990 decennial census would not be statistically adjusted.<sup>11</sup>

In deciding against adjustment, Secretary Mosbacher acknowledged that it would likely lead to more accurate figures at the national level and for racial and ethnic minorities. There was a division of opinion among the Secretary's advisors as to whether the adjusted counts were more or less accurate at the State and local levels. Secretary Mosbacher concluded that use of the adjusted numbers would not result in greater distributional accuracy, the appropriate measurement relating to apportionment of the U.S. House of Representatives. Secretary Mosbacher also expressed concern that uncertainty in the adjustment methodology and its assumptions might lead to disagreement over the numbers, and further research might weaken the evidence supporting adjustment. The Secretary also felt that adjustment might lend itself to political manipulation.

<sup>7</sup>*Federal Register*, vol. 56, No. 101, pp. 23860-23864.

<sup>8</sup>"Technical Assessment of the Accuracy of Unadjusted versus Adjusted 1990 Census Counts." Report of the Undercount Steering Committee, Bureau of the Census, Department of Commerce, June 21, 1991.

<sup>9</sup>Barbara Everitt Bryant, "Recommendation to Secretary of Commerce Robert A. Mosbacher on Whether or Not to Adjust the 1990 Census," June 28, 1991.

<sup>10</sup>Michael R. Darby, "Recommendation to the Secretary on the Issue of Whether or Not to Adjust the 1990 Decennial Census," n.d.

<sup>11</sup>Department of Commerce, Office of the Secretary, "Adjustment of the 1990 Census for Census for Overcounts and Undercounts of Population Housing; Notice of Final Decision," *Federal Register*, vol. 56, No. 140, July 22, 1991, pp. 33582-33642; Docket No. 91282-1181.

<sup>5</sup>**Advisory Panel Members Selected by the Plaintiffs**

- Eugene P. Ericksen (cochair), Professor of Sociology and Statistics, Temple University
- Leobardo F. Estrada, Associate Professor, Graduate School of Architecture and Urban Planning, University of California (Los Angeles)
- John W. Tukey, Professor of Statistics (Emeritus) and Donner Professor of Science (Emeritus), Princeton University
- Kirk M. Wolter, Vice President, A.C. Nielsen Company, Northbrook, IL

**Advisory Panel Members Selected by the Defendants**

- V. Lance Tarrance, Jr. (cochair), Chief Executive Officer, Tarrance Associates, Houston TX
- William Kruskal, Ernest DeWitt Burton Distinguished Service Professor of Statistics, University of Chicago
- J. Michael McGehee, President, McGehee & Associates, Washington, DC
- Kenneth W. Wachter, Professor of Demography and Statistics, University of California (Berkeley)

<sup>6</sup>*Federal Register*, vol. 55, No. 51, pp. 9838-9861. These guidelines established the technical and policy grounds upon which the Secretary would base his decision.



After the Secretary announced his decision, the plaintiffs returned to court, seeking an order compelling the Department to adjust the 1990 census to rectify the acknowledged undercount of certain minority groups, which the plaintiffs claimed would result in the injuries alleged in their complaint. The plaintiffs also alleged that the decision violated the July 1989 agreement, the APA, and the Constitution, and was influenced by partisan political considerations. The States of Wisconsin and Oklahoma joined the suit on the side of the Government on September 10 and December 3, 1991, respectively.

In November 1991, the Census Bureau provided the plaintiffs with redistricting data tapes containing the unofficial adjusted figures, subject to a protective order preventing their release to the public. These tapes had been produced in the event that the Secretary had decided in favor of adjustment.

On February 18, 1992, the District Court granted the plaintiffs' request for an evidentiary hearing (i.e., a trial). Judge McLaughlin presided over a 13-day trial that ended on May 28, 1992. Expert witnesses on both sides of the adjustment issue (including the four special advisory panel members appointed by the plaintiffs and one member named by the defendants) presented extensive, highly technical testimony on the assumptions, methodology, and results of the Bureau's adjustment procedure. On April 13, 1993, while finding much substantive merit in the plaintiffs' case, Judge McLaughlin ruled in favor of the defendants, stating that the Secretary's decision not to adjust the 1990 decennial census counts did not violate the APA, the Constitution, the agreement entered into by the parties, or any statute. He stated that the Secretary's conclusions under each guideline and his ultimate decision against adjustment could not be characterized as "arbitrary or capricious," an APA standard of review. In his decision, the Judge vacated the protective order regarding the adjusted data tapes, allowing for their release to the public.<sup>12</sup>

The plaintiffs filed an appeal of Judge McLaughlin's decision in the United States Court of Appeals for the Second Circuit on July 6, 1993. Not all of the existing plaintiffs joined in the appeal. The plaintiffs argued that the District Court had incorrectly applied an APA standard of review to the case, whereas, they felt the appropriate standard was one under the Constitution.

The Second Circuit heard oral arguments on January 5, 1994. On August 8 of the same year, that Court (in a 2-to-1 opinion written by Judge Amalya Kearsse) vacated the decision of the District Court, finding that the lower court had applied the wrong standard of review. The Second Circuit agreed with the District Court in rejecting a *de novo* standard of review which would have resulted in the Circuit Court deciding which numbers, adjusted or unadjusted, were more accurate. The Second Circuit also rejected conclusions reached by the Sixth and Seventh Circuit

Courts of Appeals, which had both held that there was no judicially recognizable right to sue over adjustment of the census.<sup>13</sup>

The Second Circuit proceeded to apply a different standard of review. Holding that "the right to equal apportionment is rooted in the right to equal protection," the Court determined that the equal protection provisions of the 5th and 14th amendments to the Constitution required the application of standards developed under the one-person, one-vote cases. This set of standards requires that when a Government action affects the fundamental right to vote of a "suspect" class, such as a minority, the action be subject to "heightened scrutiny." The Government must make a good-faith effort to achieve equal representation as nearly as practicable. According to the Court, the adjusted data were concededly more accurate than the unadjusted census counts. Therefore, because the Government elected to use the less accurate counts, causing a disparate and harmful impact upon minorities, then, if the decision were to stand, the Government had to demonstrate that such a position (1) furthered a legitimate governmental objective and (2) was essential for the achievement of that objective.<sup>14</sup> The Second Circuit returned the case to the District Court for a determination of legitimate governmental objective.

The States of Wisconsin and Oklahoma subsequently filed petitions for rehearing in the Second Circuit, which were rejected. These same parties then filed petitions for writs of *certiorari*<sup>15</sup> in the Supreme Court on March 31 and April 4, respectively. On June 5, 1995, the Federal Government defendants filed their own *certiorari* petition. On June 30, the plaintiffs filed a response brief requesting that the Supreme Court deny the petitions. On the same day, the States of Indiana and Ohio jointly filed an *amicus curiae* ("friend of the court") brief recommending that the Court grant the *certiorari* petitions. As of mid-September 1995, the Supreme Court had yet to decide whether to hear the case.

***Tucker v. U.S. Department of Commerce.*** This suit, seeking adjustment of the 1990 census, was filed on March 27, 1990, in the U.S. District Court for the Northern District of Illinois, Eastern Division (Chicago), by citizens of the State of Illinois.

On July 27, 1990, the State of Illinois filed a motion to intervene as a plaintiff. On March 12, 1991, District Court Judge Brian Duff denied the State of Illinois' motion and dismissed the plaintiffs' complaint as presenting a nonjusticiable<sup>16</sup> "political question."<sup>17</sup> On April 9, 1991, the plaintiffs appealed to the United States Court of Appeals for the Seventh Circuit. The City of Chicago filed an *amicus curiae*

<sup>13</sup>The Sixth and Seventh Circuit Courts decided the cases to *City of Detroit v. Franklin* and *Tucker v. U.S. Department of Commerce*, respectively. See below, pp. 21-23.

<sup>14</sup>34 F. 3d 1114.

<sup>15</sup>A petition for a writ of *certiorari* is a request that a higher court decide to hear a case and review a lower court's ruling. The term most commonly refers to such requests made of the U.S. Supreme Court.

<sup>16</sup>A non justiciable issue is one that is not appropriate for court review.

<sup>12</sup>*City of New York v. U.S. Department of Commerce*, 822 F. Supp. 906, 739 F. Supp. 761, 713 F. Supp. 48.

brief on July 1, 1991. On March 16, 1992, the Circuit Court unanimously upheld the District Court's ruling, holding that "...[t]he plaintiffs' claim to a census adjustment invokes no judicially administrable standards. They are asking us to take sides in a dispute among statisticians, demographers, and census officials concerning the desirability of making a statistical adjustment to the census headcount." On March 30, 1992, the plaintiffs filed a petition for rehearing, which was denied. The plaintiffs' then filed a *certiorari* petition in the U.S. Supreme Court, which that Court denied on November 2.

**City of Detroit v. Franklin.** The plaintiffs—the City of Detroit, Michigan and Coleman A. Young, individually and as mayor of Detroit—filed this suit in U.S. District Court for the Eastern District of Michigan, Southern Division, on July 25, 1991, contending that the 1990 decennial census resulted in a miscount for Detroit and calling for an adjustment of the 1990 census for racially differential undercounts and overcounts within the State of Michigan.

The plaintiffs made two separate claims with regard to the allegedly deficient, official census count for Detroit. First, they contended that, because of characteristics particular to Detroit<sup>18</sup> (i.e., not present in other subunits of Michigan), the city suffered a "miscount" of its population. Additionally, Detroit claimed that as a result of its large black population, it suffered a disproportionately higher undercount (i.e., a racially differential undercount) than other subunits of Michigan with little or no black population, also resulting in a serious underreporting of the city's true population.

Unless the court ordered the defendants to correct the miscount and carry out a statistical adjustment for the racially differential undercount, the plaintiffs contended that the residents of Detroit, including the individual plaintiff, would receive proportionately less representation in Congress than the residents of all other subunits of Michigan (in violation of Article I, Section 2 of the Constitution) and the city would receive fewer Federal dollars, both in absolute terms and in relation to other subunits of Michigan, than it was lawfully entitled to. Plaintiffs also argued that the defendants' actions were arbitrary and capricious and therefore violated the APA.

On October 30, 1991, the defendants filed a change-of-venue motion to move this case to the U.S. District Court for the Eastern District of New York for consolidation with the *New York* case (see above). The defendants sought to have the case consolidated with *New York* because of the statistical adjustment component of the suit. However, the

plaintiffs opposed the motion, arguing that because their adjustment claim pertained only to the State of Michigan and their suit also contained the separate "miscount" claim, consolidation would not be appropriate. On February 21, 1992, Judge William Zatkoff denied the defendants' motion.

On August 14, 1992, the District Court granted the defendants' motions for summary judgment on the grounds that the plaintiffs lacked standing to sue because they could establish neither any causal connection between the plaintiffs' alleged injuries and the defendants' actions nor any constitutional right allegedly violated by the defendants' actions that could be remedied by the Court. The plaintiffs appealed to the U.S. Court of Appeals for the Sixth Circuit in September 1992. That Court heard oral arguments on June 21, 1993, and issued a decision on September 22, 1993, that affirmed the District Court's ruling in favor of the defendants. Judge Cornelia G. Kennedy presented the opinion of the Court.

With regard to the plaintiffs' adjustment claim, the Sixth Circuit agreed with the District Court's interpretation that the plaintiffs could not claim that the differential undercount in the 1990 census resulted in Detroit's receiving proportionately less representation in the U.S. House of Representatives than residents of all other subunits in Michigan. The Sixth Circuit Court concurred with the District Court's reasoning that since the Census Bureau did not create State or Federal legislative districts and since the Michigan legislature was not compelled to use (unadjusted) census data for redistricting, there was no causal link between the defendants' actions and the alleged dilution of the individual plaintiff's voting power. Therefore, the plaintiffs failed to establish standing with regard to this alleged injury.

While finding that the plaintiffs' claim that the defendants' actions would result in a loss of Federal funds satisfied the injury-in-fact requirement of standing, the Sixth Circuit relied on the Seventh Circuit's decision in *Tucker*, stating that there was no judicially enforceable constitutional right on which to challenge the defendants' actions: "...[N]othing in the Constitution compels such an accurate result [a perfectly accurate count]."

The Court also examined the plaintiffs' claim that there existed a genuine issue of material fact as to whether an adjustment for the racially differential undercount in Michigan would produce a population count for the State that, on balance, would be more accurate than the official unadjusted census count. Here, Judge Kennedy relied on the decision in the *New York* case, in which the District Court upheld the Secretary of Commerce's decision not to adjust the 1990 census counts, finding that the decision did not violate the APA, the Constitution, or any statute. Judge Kennedy also stated that the Secretary's concerns about the distributional accuracy of the adjusted counts, particularly below the State level, and the zero-sum nature of the distribution of Federal funds, foreclosed the possibility of an adjustment of the population count of the State of Michigan alone.

<sup>17</sup>A "political question" is an issue a court refuses to consider because its resolution is properly within the domain of the executive and/or legislative branches of government.

<sup>18</sup>These characteristics included: Large number of housing units the addresses of which the United States Postal Service was unable to identify; large public housing projects where a number of persons were housed illegally; and large numbers of low-income residents in housing units (such as converted garages and illegally subdivided single-family homes) that were not likely to be on master address lists and whose occupants, therefore, were not likely to be counted.

On December 15, the plaintiffs filed a *certiorari* petition in the U.S. Supreme Court. The defendants filed an opposing brief on February 15, 1994. On March 7, the U.S. Supreme Court denied the plaintiffs' petition.

**City of Atlanta v. Mosbacher.** The plaintiffs filed suit in the U.S. District Court for the Northern District of Georgia (Atlanta Division) on December 21, 1990, seeking adjustment of the 1990 census. The Government filed a change-of-venue motion to transfer this case to the U.S. District Court for the Eastern District of New York for consolidation with the *New York* lawsuit (see above), pointing out that the plaintiffs in the *Atlanta* case sought the same relief as those in the *New York* lawsuit. On February 24, 1992, District Judge William O'Kelley granted the motion, and on May 6, 1992, Judge McLaughlin (presiding over the *New York* case) consolidated the cases.

**City of Toccoa, Georgia v. U.S. Department of Commerce.** The plaintiffs filed this suit on March 29, 1991, in the U.S. District Court for the Northern District of Georgia, Gainesville Division, seeking an adjustment of the 1990 census for the plaintiff cities and counties—all located in the State of Georgia. However, they decided to attempt to settle their claims through the Census Bureau's count question resolution (CQR) process and requested that the Court grant a stay to allow them to complete this process. On March 5, 1992, Judge William O'Kelley granted the plaintiffs' motion for a stay. On September 28, 1993, the plaintiffs informed the judge that they were satisfied with the resolution of the CQR process. The Court therefore issued an order dismissing the case without prejudice unless the plaintiffs filed an objection within 90 days. The plaintiffs did not file any such objection, and the lawsuit was dismissed.

**Meña v. Mosbacher.** On February 7, 1991, the plaintiffs filed a class-action lawsuit in the U.S. District Court for the Southern District of Texas (Brownsville Division) against: (1) Federal defendants (the U.S. Secretary of Commerce and the Director of the Census Bureau) to bar the use of "unadjusted" 1990 census data for reapportionment and (2) the State of Texas and State and local defendants (including State and county officials involved in the redistricting process) to prevent the data's use for redistricting in that State. On September 26, 1991, District Court Judge Filemon Vela consolidated this case with the *Texas* lawsuit (see the *Texas* suit below for a summary of the consolidated case).

**Texas v. Mosbacher.** This suit was filed by the State of Texas on August 28, 1991, in the U.S. District Court for the Southern District of Texas (Brownsville Division). The plaintiff sought an adjustment of the 1990 decennial census for the distribution of Federal funds or the establishment of an alternative method for the allocation of those funds. Texas contended that the disbursement of Federal monies to the State (and its residents) on the basis of the unadjusted 1990 decennial census counts (and intercensal estimates based on those counts) violated the following

provisions of the Constitution: the "spending" and "necessary and proper" clauses and the equal protection component of the fifth amendment. Texas claimed that the use of unadjusted 1990 census counts would result in a loss of Federal funds to the State that could exceed a billion dollars over the decade.

On September 26, 1991, District Court Judge Filemon Vela consolidated *Meña v. Mosbacher* with this case. However, despite the consolidation, the *Meña* plaintiffs continued to file separate briefs, since their claimed injuries and the relief they sought were not the same as those of the State of Texas. Technically, the State of Texas and State and local officials were still defendants in the *Meña* action.

Judge Vela heard oral arguments on all pending motions on March 5, 1992, and ordered Texas to brief the court on how the present case differed from the *New York* suit (see above), since Texas was also a plaintiff (intervenor) in that case. On April 3, 1992, Texas filed a brief contending that substantive differences existed between this case and the *New York* suit. However, the State acknowledged that it would be appropriate for the Court to await the outcome of the *New York* trial. Although the Federal defendants continued to argue for dismissal, all parties subsequently agreed to a stay pending the resolution of the *New York* case. As of mid-September 1995, no further action had occurred in this suit.

**Lawsuits to Prevent an Adjustment of the 1990 Census Counts**—Two lawsuits, filed prior to the court-imposed deadline of July 15, 1991, for the Secretary's decision on adjustment, sought to prevent the Secretary from statistically adjusting the census.

**State of Washington v. U.S. Department of Commerce.** The plaintiffs filed their complaint on March 7, 1991, in the U.S. District Court for the Western District of Washington at Seattle. They contended that an adjustment of the 1990 census counts would decrease Washington's allotment of seats in the U.S. House of Representatives,<sup>19</sup> thereby depriving its citizens, including the individual plaintiffs, of full political representation in violation of Article 1, Section 2, and the 5th and 14th amendments to the Constitution. The plaintiffs also argued that an adjustment would violate the APA and laws relating to the decennial census and would cause a loss of Federal funds to Washington and its citizens.

The plaintiffs sought an injunction prohibiting any change to their officially certified allotment of nine House seats, preventing a statistical adjustment of the 1990 census counts, and requiring the defendants to continue to use the official, unadjusted 1990 census counts for all purposes for which they use those data.

<sup>19</sup>In fact, if the Secretary had decided in favor of adjustment, an apportionment based on the adjusted census figures would not have affected Washington's allotment of nine House seats.

As a result of the Secretary's decision not to adjust the 1990 census counts, the defendants asked the Court to dismiss the suit on October 15, 1991. Ten days later, the plaintiffs filed their notice of dismissal pertaining to the executive branch defendants. On October 29, 1991, District Court Judge Thomas Zilly dismissed the complaint against those defendants; however, the Clerk of the U.S. House of Representatives remained a defendant. Subsequently, the case was altogether dismissed.

#### ***State of Wisconsin v. U.S. Department of Commerce.***

On June 17, 1991, the State of Wisconsin filed suit in the U.S. District Court for the Western District of Wisconsin. Based on the final PES estimates released on June 13, 1991, Wisconsin would have lost one seat in the U.S. House of Representatives (vis-a-vis using the unadjusted counts) if the Secretary had decided in favor of adjustment. Wisconsin contended that this loss would deprive its citizens of representation to which they were constitutionally and legally entitled. The plaintiffs also argued that a statistical adjustment of the decennial census would violate a number of constitutional and/or statutory provisions, in particular, Title 13, United States Code, Section 195, that, in their view, prohibits the use of sampling for arriving at population counts used to apportion the U.S. House of Representatives. Additionally, Wisconsin contended that an adjustment would cause the State to lose Federal funding distributed on the basis of census data, thereby depriving its citizens of equal protection under the law as guaranteed by the 5th and 14th amendments.

The same day the Secretary decided not to adjust the 1990 census, Wisconsin filed a motion to intervene as a defendant in the *New York* case (see above) and on July 25, voluntarily dismissed its own suit. The State of Wisconsin's motion was granted on September 10, 1991.

#### **Lawsuits Seeking Release of the Adjusted Block-Level Counts**

Four lawsuits sought release of the adjusted block-level census data tabulated for redistricting purposes. (Public Law 94-171 stipulates that the Census Bureau release block-level data to the States within 1 year of the decennial census date; see also ch. 10). The Bureau had prepared these data for distribution to the States in the event the Secretary had decided in favor of adjustment.

The plaintiffs in these lawsuits contended that, even though the Secretary of Commerce had decided against adjustment, they should nonetheless be entitled to access to the unofficial adjusted block-level counts for their States' use (i.e., redistricting and other uses). These plaintiffs maintained that the adjusted counts more accurately reflected the numerical and distributional accuracy of their respective populations. Although most State constitutions mandate the use of official census data for redistricting, no Federal statute requires such use.

***Assembly of the State of California v. U.S. Department of Commerce.*** This was the principal lawsuit on this issue. The plaintiffs originally requested the adjusted P.L. 94-171 data tapes under the Freedom of Information Act (FOIA;

Title 5, United States Code, Section 552) on April 10, 1991. The Census Bureau denied this request on the grounds that the specified data formed the basis of an intradepartmental recommendation that the Secretary of Commerce had rejected, and therefore were protected from disclosure by the deliberative process privilege of Exemption 5 of the FOIA. The California Assembly appealed this determination, which the Commerce Department upheld. The plaintiffs, having exhausted all administrative remedies to gain access to these records, filed suit on July 25, 1991, in the U.S. District Court for the Eastern District of California.

On August 20, 1991, the District Court granted the plaintiffs' request for a preliminary injunction compelling the defendant to release the adjusted redistricting data tapes for California. The Department immediately appealed this decision to the Ninth Circuit Court of Appeals. On August 30, that Court issued an order requiring their release no later than September 3, 1991. The Department of Commerce then filed an emergency stay application with U.S. Supreme Court Justice Sandra Day O'Connor. On September 10, 1991, the Supreme Court granted the defendant's application for stay pending final disposition of the appeal. On November 19, 1991, the parties stipulated that they would seek a stay in the Ninth Circuit Court and file cross-motions for summary judgment in the District Court.

Meanwhile, on November 13, 1991, the District Court in the *New York* case (see above) had ordered the release, under a protective order, of the adjusted redistricting data tapes for the entire country to the plaintiffs, including the State of California. The order prohibited the plaintiffs from releasing the data to parties outside the litigation and from using the data for purposes other than litigating the suit.

On February 7, 1992, Judge William Shubb, of the U.S. District Court for the Eastern District of California, ordered the release of the adjusted data tapes for California. The Department filed an appeal in the Ninth Circuit Court of Appeals on February 13. On May 11, the Court heard oral arguments and on July 1, unanimously upheld Judge Shubb's order.

The Ninth Circuit's decision stated that the appropriate standard of review under the FOIA was for the Court to determine whether the District Court judge had an adequate factual basis for his or her decision, and therefore the Court would only reverse the lower court's findings if they were determined to be clearly erroneous. The Ninth Circuit Court agreed with the District Court's findings that:

- The record did not support the inference that the adjusted block counts played a meaningful role in the adjustment decision process
- The adjusted census data tapes were factual in nature and therefore their disclosure would reveal nothing about the deliberative process
- The determination of whether or not the adjusted data tapes were predecisional should be limited to the Secretary's July 15, 1991, adjustment decision and should not consider the decision process regarding their possible use in calculating the intercensal population estimates

- The inaccuracy of the adjusted census data or the claim of harm to the Department's reputation by the release of data known to be flawed did not justify the withholding of information under the FOIA.

Following the Ninth Circuit's decision, the Department chose not to file a *certiorari* petition with the U.S. Supreme Court. On January 8, 1993, the Department released the adjusted data tapes for California to the plaintiffs, and on May 28, 1993, the District Court awarded the plaintiffs \$346,204 in attorneys' fees.

**Senate of California v. Franklin.** On July 31, 1991, the plaintiffs filed this suit in the U.S. District Court for the Central District of California, seeking release of the adjusted redistricting data tapes for the State of California. Unlike the Assembly, the California Senate did not try the FOIA approach, but instead claimed that refusal to release the adjusted data tapes violated the U.S. Constitution—Article I, Section 2, and the 5th, 14th, and 15th amendments—and the Voting Rights Act of 1965, as amended.

On August 14, 1991, Judge Consuelo Marshall ordered the defendants to immediately release the adjusted census data for California. The next day, the defendants filed an appeal in the U.S. Court of Appeals for the Ninth Circuit and a motion for stay pending their appeal. On August 30, the Ninth Circuit Court stayed the District Court's order pending disposition of the defendants' appeal in the Circuit Court. That Court heard oral arguments on June 4, 1992, and on July 6, reversed the District Court's decision.

Judge Ferdinand Fernandez presented the opinion of the Court, quoting the Supreme Court, stating that "[t]here is no constitutional right to have access to particular government information, or to require openness from the bureaucracy." The Ninth Circuit similarly found no such right to access in the census statutes.

In addition, Judge Fernandez asserted that "[i]f the state knows that the census data is [sic] underrepresentative, it can, and should, utilize noncensus data in addition to the official count in its redistricting process.... It is the state's responsibility, and not the Secretary's, to satisfy the mandates of the Voting Rights Act." The plaintiffs did not appeal the Ninth Circuit's ruling.

**Florida House of Representatives v. Mosbacher.**<sup>20</sup> The plaintiffs filed suit on December 19, 1991, in the U.S. District Court for the Northern District of Florida, Tallahassee Division. They sought adjustment of the 1990 decennial census as well as release of the adjusted redistricting data for the State of Florida.

The plaintiffs' claims regarding release of the adjusted data tapes for Florida were identical to those made by the plaintiffs in the *California Senate* case, i.e., they did not seek to obtain the data under the FOIA, but, instead,

claimed that refusal to release these data tapes violated the U.S. Constitution—Article I, Section 2, and the 5th, 14th, and 15th amendments—and the Voting Rights Act of 1965, as amended.

On January 24, 1992, the defendants filed a change-of-venue motion to transfer this case to the U.S. District Court for the Eastern District of New York, for consolidation with the *New York* suit (see above). In arguing for consolidation, the defendants noted that the plaintiffs sought the same relief as those plaintiffs in the *New York* case, at least with regard to their adjustment claim. The defendants also pointed out that the State of Florida had already intervened as a plaintiff in the *New York* case. As a plaintiff in that suit, Florida had gained access to the adjusted redistricting data tapes for the entire country, pursuant to the stipulation and order of November 13, 1991. However, that agreement made the data available to the plaintiffs under a protective order, thereby prohibiting them from releasing the data to parties outside the litigation and/or from using the data for purposes other than litigating the suit, such as redistricting. On April 8, 1992, Judge Maurice Paul granted the defendants' motion, and on June 6, the cases were consolidated.

**Florida House of Representatives, Honorable T.K. Wetherell, Speaker v. U.S. Department of Commerce.**

Like the plaintiffs in *California Assembly*, T.K. Wetherell, as Speaker of the Florida House of Representatives, initially (on July 19, 1991) requested the adjusted census data tapes pertaining to his State under the FOIA. On August 19, the Census Bureau denied his request pursuant to Exemption 5 of the FOIA (see above discussion under *California Assembly*). After exhausting the available administrative appeal, Mr. Wetherell filed this suit on October 10, 1991, in the U.S. District Court for the Northern District of Florida, Tallahassee Division.

On January 9, 1992, Judge William Stafford ordered the release of the adjusted data for Florida by January 13, but granted the defendant an extra day to comply. The defendant filed an appeal and a motion for stay in the U.S. Court of Appeals for the Eleventh Circuit. On January 14, that Court granted the defendant's motion and agreed to hear the appeal. On March 18, the Eleventh Circuit heard oral arguments, and on May 27, 1992, reversed the District Court's decision. The Circuit Court stated that "[b]ecause the adjusted census block data are a subordinate's opinion and reflect the give-and-take of the deliberative process, we hold that the data are deliberative, and in turn, within the scope of the deliberative process privilege [of Exemption 5 of the FOIA]." The plaintiff did not appeal the Eleventh Circuit's ruling.

**The Constitutionality of the Apportionment Formula**

Two lawsuits challenged the constitutionality of the current apportionment formula, in use since the apportionment following the 1940 census, and known as the "equal proportions" or Hill method.

<sup>20</sup>T. K. Wetherell (Speaker of the Florida House of Representatives) and a plaintiff in this case, was also a party to a separate suit, dealing solely with release of the adjusted block-level counts for his State (see *Florida House of Representatives, Honorable T. K. Wetherell, Speaker v. U.S. Department of Commerce* below).



***State of Montana v. U.S. Department of Commerce.*** In this suit, filed in the U.S. District Court for the District of Montana, Helena Division on May 22, 1991, the plaintiffs contended that as a result of the use of the equal proportions apportionment formula, as mandated by Section 2a(a) of Title 2, United States Code, Montana lost a congressional seat in the reapportionment following the 1990 decennial census. The plaintiffs claimed that this action rendered Montana the single most populous congressional district in the country;<sup>21</sup> with a population of over 800,000 people, its single district was approximately 40 percent larger than the average United States district size of 572,466. As a result of this disparity, the plaintiffs contended that the voting power of Montana residents would be diminished, thereby violating the Constitution's "one person, one vote" principle. Additionally, they alleged that the self-executing nature of the statutory scheme by which reapportionment is determined (Section 2a(a) of Title 2, United States Code) is in violation of Article I, Section 2, since it provides for no consideration or determination by Congress of the apportionment of the U.S. House of Representatives.

The plaintiffs requested that the defendants be permanently enjoined from effecting reapportionment of the House of Representatives under the provisions of Section 2a(a) of Title 2, United States Code, and that the court declare those provisions to be unconstitutional.

A three-judge court heard oral arguments on September 3, 1991. On October 18, 1991, the court ruled that the equal proportions apportionment formula was unconstitutional and permanently enjoined the defendants from reapportioning the House of Representatives.

District Judges Charles C. Lovell and James F. Battin filed a majority opinion stating that Congress had ignored the Article I, Section 2 goal of equal representation for equal numbers of people by relying on an apportionment method that did not minimize absolute population variances among districts. They further stated that the plaintiffs met their burden of showing that another recognized and accepted statistical method, the Dean method<sup>22</sup> (also known as the method of "harmonic means"), would more closely meet the constitutional mandate of absolute population equality among districts. The burden, they asserted, therefore shifted to the defendants to demonstrate that the greater disparity under the equal proportions method was necessary and that the defendants had failed to meet that burden.

Judge Diarmuid F. O'Scannlain of the U.S. Court of Appeals for the Ninth Circuit, the third member of the three-judge court, dissented, stating that either of the two alternative formulas (the Dean method and the Adams

<sup>21</sup>The State of Montana was allocated two House seats in the reapportionment following the 1980 census.

<sup>22</sup>Under the Dean Method, Washington State's ninth seat would be reassigned to Montana, giving the latter two seats. Washington's motion to appear as *amicus curiae* had been granted on July 8, 1991.

method,<sup>23</sup> also known as the method of "smallest divisors") put forth by Montana resulted in a greater absolute population variance (when considering all 435 districts) from the ideal district size than the equal proportions formula. He argued that the State of Montana had failed to show that the equal proportions formula was not the nearest practical approximation to achieving population equality among all districts.

On November 26, 1991, the defendants filed a direct appeal to the Supreme Court and on December 16, 1991, that Court noted probable jurisdiction. After the plaintiffs and defendants filed briefs (and the States of Washington and Massachusetts<sup>24</sup> filed *amicus curiae* briefs), the Supreme Court heard oral arguments on March 4, 1992, and on March 31, issued a unanimous decision. The Court held in favor of the defendants, stating that Congress had exercised its apportionment authority within the limits dictated by the Constitution.

***Franklin v. Massachusetts.*** The plaintiffs in this lawsuit challenged the constitutionality of the current apportionment formula as well as the legality and/or constitutionality of including Federal military and civilian employees and their dependents living overseas in the 1990 decennial census counts used for apportioning the U.S. House of Representatives.

The plaintiffs filed suit on May 1, 1991, in the U.S. District Court for the District of Massachusetts. They contended that the defendants' inclusion of overseas Federal employees and their dependents in the 1990 census for congressional apportionment purposes violated the requirement of Article I of the Constitution, as amended by the 14th amendment, that Representatives in Congress be apportioned among the States in proportion to "the whole number of persons in each State."

Furthermore, they alleged that the defendants disregarded their own "usual residence rules" in allocating overseas Federal employees and their dependents to particular States, and that such action was arbitrary, capricious, and in violation of the APA. The plaintiffs requested that the Court order a reapportionment of seats in the U.S. House of Representatives based on 1990 census counts of persons who had a usual residence within a State as of the census date. In previous censuses, overseas military personnel, U.S. Government civilian personnel, and their dependents had not been included in the apportionment counts (except for the 1970 census, when they were included).<sup>25</sup>

The Census Bureau used Department of Defense (DOD) "home of record" data as the basis for allocating its overseas military employees and their dependents to their

<sup>23</sup>Using the Adams method would also have given Montana two House seats, at the same time shifting 17 other seats among 16 States.

<sup>24</sup>The State of Massachusetts filed its own lawsuit challenging the apportionment formula. However, the plaintiffs in that case advocated the use of another formula, Webster's method, also known as the method of "major fractions" (see *Franklin v. Massachusetts* below).

<sup>25</sup>See above for a brief summary of the decision to include overseas Federal employees and their dependents in the 1990 apportionment counts and the legislation on this issue introduced during the 100th and

"home" States.<sup>26</sup> The plaintiffs contended that the Census Bureau used these data despite DOD testimony before the Congress that the "home of record" data in its personnel files had a high error rate and none of the data elements in their personnel records met a reasonable test of validity for use in arriving at apportionment counts.

The plaintiffs noted that if the overseas counts had not been included in the apportionment figures, Massachusetts would have received 11, rather than 10, House seats, with the additional seat coming at the expense of Washington State, which would have received 8 seats, instead of 9. Washington later filed a motion in the District Court to appear as *amicus curiae* in this action, since it stood to lose its ninth seat if the Court invalidated the inclusion of the overseas population in the apportionment counts. That motion was granted.

The plaintiffs also contended that defendants' application of the equal proportions method to the 1990 census counts for the apportionment of seats in the U.S. House of Representatives was unconstitutional since the allegedly inherent bias of that method in favor of less populated States violated the principle of one person, one vote as mandated by Article I, Section 2 of, and the fifth amendment to, the Constitution.

The plaintiffs advocated using Webster's method ("major fractions") which they contended had "...no statistical bias toward either less or more populated states." (Complaint, page 13). Using Webster's method, Massachusetts would have received 11 seats in the House instead of 10 (regardless of whether the overseas population was included in the apportionment totals), with the additional seat coming at the expense of Oklahoma, which would have received 5, rather than 6, seats.

A three-judge court heard oral arguments on December 6, 1991, and on February 20, 1992, issued an opinion and order stating that the current apportionment formula (equal proportions) was not in violation of the Constitution, but that the Census Bureau's inclusion of Federal military and civilian employees and their dependents living overseas in the 1990 census apportionment counts on the basis of "home of record" data, was arbitrary and capricious and an abuse of discretion in violation of the APA. The Court found that the Census Bureau's actions contravened that Act since the agency relied on data that it consistently found to be too unreliable to be used for such purposes. The three-judge court also ordered a reapportionment of the U.S. House of Representatives based on the exclusion of the overseas counts. Finally, it ordered a redistricting of the State of Massachusetts based on an allotment of 11 seats.

On March 5, 1992, the defendants filed motions for reconsideration and for a stay (pending reconsideration

and appeal) with the three-judge court. On March 13, the court denied these motions. The defendants appealed this decision to the Supreme Court and on March 20, that Court noted probable jurisdiction. The plaintiffs, who were not satisfied with the District Court's ruling with regard to the constitutionality of the current apportionment formula, filed their own appeal in the Supreme Court on March 23. The State of Washington filed several *amicus curiae* briefs in the Supreme Court supporting the Government's position. On March 27, 1992, the Supreme Court granted a stay of the District Court's ruling (including the order that the defendants reissue the apportionment counts, excluding the overseas population, to the Clerk of the U.S. House of Representatives by March 30, 1992) pending disposition of the defendants' appeal.

The Supreme Court heard oral arguments on April 21, 1992. On June 26, a unanimous Court held that it was proper for the Secretary of Commerce to allocate Federal military and civilian personnel (and their dependents) serving abroad to the State population counts used for apportioning the U.S. House of Representatives.

Although the decision was unanimous, the Court issued three separate and disparate opinions as to the reasoning behind the decision. The opinion of the Court, written by Justice O'Connor, held that the Secretary's transmittal of State population totals to the President was not a final agency action reviewable under the APA since the apportionment counts were not final until the President took affirmative steps to calculate and transmit the apportionment to Congress. Furthermore, the President's action was not subject to review under the APA since he was not an agency within the meaning of the act.

Regarding the plaintiff's constitutional claims, the Court held that the Secretary's decision to include overseas Federal employees and their dependents in the apportionment counts was "...consonant with, though not dictated by, the text and history of the Constitution...." With regard to their challenge to the method of allocation, the Court concluded that the plaintiffs had failed to establish standing, since they neither argued nor demonstrated that the use of some other ("more accurate") data would not have resulted in an allocation of 10 House seats to Massachusetts.

Justice Stevens, in a separate opinion in which Justices Blackmun, Kennedy, and Souter concurred, disagreed with the opinion of the Court with regard to reviewability under the APA. He argued that the President's role in transmitting the apportionment counts to Congress was purely ministerial and, therefore, the Secretary's action was final and could be reviewed under the APA. Applying the standard of that act, Justice Stevens found that the Secretary's action was not arbitrary or capricious.

Justice Scalia also wrote a separate opinion. He agreed with the opinion of the Court regarding nonreviewability under the APA. However, he argued that there was no standing to review the constitutionality of the overseas population claim because one element of standing, redressability by the court, was not present. Because the President's

<sup>1</sup>101st Congresses. For a general discussion of the treatment of Americans overseas in the decennial census, see Karen M. Mills, *Americans Overseas in U.S. Censuses*, Census Bureau Technical Paper 62 (Washington, DC: Government Printing Office, 1993).

<sup>26</sup>Department of Defense military personnel stationed overseas and their dependents constituted approximately 87 percent of the total overseas count in 1990.



action under the apportionment statute was not ministerial, he could not be compelled to revise his action by a court order. Accordingly, there was no effective remedy to correct the alleged injury.

Because they had recently affirmed the constitutionality of the equal proportions apportionment formula in the *Montana* suit (see above), the Justices did not need to address that aspect of this case.

## Census Design and/or Procedures

**Ridge v. Verity.** In this suit, filed on February 18, 1988, in the U.S. District Court for the Western District of Pennsylvania, the plaintiffs challenged the defendants' plans with regard to the inclusion of undocumented aliens in the 1990 decennial census counts used for apportionment. The plaintiffs included the States of Pennsylvania, Kansas, and Alabama; 42 U.S. Representatives from 15 States; the Coalition for Constitutional Reapportionment; and the Federation for American Immigration Reform (FAIR).

They contended that it was unconstitutional (violating Article I, Section 2, and Article II, Section 1, of the Constitution and the 14th amendment to the Constitution) for the defendants to include undocumented aliens in the apportionment counts and that the defendants were obligated to take all necessary actions to avoid including undocumented aliens in those counts.

The plaintiffs further contended that, because of the planned inclusion of undocumented aliens in the 1990 census apportionment counts, the States of Pennsylvania, Kansas, Alabama, West Virginia, Arizona, Georgia, Michigan, Minnesota, North Carolina, and Wisconsin faced a realistic danger of suffering a loss of Congressional representation and electoral college votes as a consequence of an apportionment based on those counts.

The following parties filed motions to intervene on the defendants' side in June 1988: the States of Texas and New York, the cities of Chicago and New York, and *Marquez et al.*<sup>27</sup> The motions were denied; however, these parties were granted *amicus curiae* status in the litigation. Additionally, other parties participated in the case in that capacity, including 42 additional members of the U.S. House of Representatives (from districts in California, New Mexico, New York, Texas, Puerto Rico, Guam, and the Virgin Islands) who filed a joint motion, and Pennsylvanians for Effective Government, a nonprofit association representing business interests in Pennsylvania.

<sup>27</sup>*Marquez et al.*, was a group of U.S. citizens and residents of Hispanic origin (residing in the States of California, Illinois, New York, and Texas—States with large Hispanic populations) and several organizations (the League of United Latin American Citizens, the Southwest Voter Registration and Education Project, the Midwest Voter Registration and Education Project, and the International Ladies Garment Workers Union) that claimed that, in addition to the interests represented by the defendants, they had a particular interest in the disposition of this case since, if the plaintiffs prevailed, it would be more difficult for these organizations to encourage Hispanic participation in the 1990 census, resulting in an increased undercount of Hispanics lawfully residing in the United States.

On January 26, 1989, U.S. District Court Judge William L. Standish heard oral arguments regarding the issues of constitutionality and standing. On May 8, 1989, the Court ruled in the defendants' favor, stating that the plaintiffs did not have standing to sue. In reaching his decision, Judge Standish relied on the analysis of the U.S. District Court for the District of Columbia in *Federation for American Immigration Reform (FAIR) v. Klutznick*, which dealt with the same issue with regard to the 1980 census. That Court held that the plaintiffs were unable to show with requisite specificity which States would gain or lose representation in Congress and thus could not demonstrate "...a concrete injury to some particular resident of some particular state." (Opinion, page 9, quoted from FAIR) As Judge Standish stated in his decision in referring to that case, "...the interest of the individual plaintiffs in the present case is no less speculative than the interest of the plaintiffs in *FAIR*." (Opinion, page 9) Thus, the plaintiffs failed to establish the necessary injury-in-fact requirement of standing.

Additionally, Judge Standish found that the plaintiffs failed to show that the remedy they sought would redress their alleged injuries. As part of the relief they sought, the plaintiffs had requested that the Court order the defendants to take all necessary actions to avoid including undocumented aliens in the apportionment counts.

The plaintiffs contended that the defendants could use the "residual method" to determine the number of undocumented aliens counted in the 1990 census in order to exclude them from the apportionment counts. However, the Court concluded that the plaintiffs had failed to show that the defendants could successfully implement this methodology to accomplish such a result. Judge Standish therefore found: "As in *FAIR*, the potential success of the Census Bureau in identifying illegal aliens for purposes of excluding them from the figures used for apportionment is speculative." (Opinion, page 30.) Since the Court determined that the plaintiffs did not have standing, it did not need to address the constitutionality of including (or excluding) undocumented aliens from the census counts used to apportion the U.S. House of Representatives. The plaintiffs did not appeal this ruling.

**City of Chicago v. U.S. Department of Commerce.** In this lawsuit, filed in the U.S. District Court for the Northern District of Illinois, Eastern Division, on February 27, 1991, the plaintiffs challenged the 1990 census design, implementation, and results for the city of Chicago, Illinois.

The plaintiffs alleged that the procedures for conducting the 1990 census in Chicago were inadequately designed and/or not properly or fully implemented by the Census Bureau and that as a result of defendants' actions, residents of the city would be deprived of full and fair representation in the U.S. House of Representatives and the Illinois legislature and would also be deprived of substantial amounts of Federal and State funds. In their complaint, the

plaintiffs listed a number of specific census operations or activities for which they felt the defendants' conduct was deficient.<sup>28</sup>

The plaintiffs asked the Court to require the defendants "...to complete, repeat, revise, and reformulate the enumeration of the population of the City of Chicago... with the end result being the most accurate census practicable of the City...." (Complaint, p. 17.)

On May 21, 1991, Judge Brian Duff dismissed the case without prejudice and suggested that the plaintiffs await the outcome of the Secretary's adjustment decision and/or the then pending count question resolution (CQR) process, since either of these had the potential to affect the city's final census count. After the announcement of the Secretary's decision against adjustment, the plaintiffs pursued the CQR process and did not refile their suit.

#### ***District of Columbia v. U.S. Department of Commerce.***

In this suit, filed in the United States District Court for the District of Columbia on January 25, 1991, the plaintiff claimed that the Census Bureau's application of its "usual residence rules" to include Lorton prison (located in Virginia) inmates in the census population count for the Commonwealth of Virginia violated the APA, Article 1, Section 2, Clause 3 of the Constitution, and the "due process clause" of the fifth amendment.

The plaintiff further claimed that the defendants' action would cause the District of Columbia to lose \$60 million in Federal funds over the decade. The plaintiff sought to have Lorton residents included in the census counts for the District of Columbia on the basis that the DC government had "complete and exclusive control and management" (Complaint, p. 3) of the prison facility and that "...Congress has determined that these people [Lorton residents] are for significant governmental purposes to be treated as residents of the District of Columbia." (Complaint, p. 4.)

On April 3, 1992, Judge John H. Pratt ruled in favor of the defendants, stating that the Census Bureau's application of its "usual residence rules" to Lorton inmates was a rational decision that was neither arbitrary nor capricious, nor did it violate the constitutional command of the census clause.

#### ***National Law Center on Homelessness and Poverty v. Franklin.***

In this suit, filed in the U.S. District Court for the District of Columbia on October 8, 1992, the plaintiffs challenged the design, implementation, and results of the 1990 decennial census Street and Shelter Night (S-Night) operation (for a brief description of this operation, see above, p.2, footnote 1; for a more detailed discussion, see ch. 6).

<sup>28</sup>Among the census operations or activities mentioned in the complaint were: The precensus and postcensus local review programs; the plaintiffs' access to final, corrected TIGER files; master address list compilation; questionnaire design, content, and delivery; procedures for obtaining Spanish-language questionnaires; telephone questionnaire assistance; and enumerator hiring, training, supervision, deployment, and pay.

The plaintiffs claimed that the 1990 count of people living in shelters or present at preidentified street sites was "...so arbitrarily limited in scope and deficient in execution as to be useless as a count of even a segment of the homeless population." (Complaint, page 5.)

The plaintiffs further stated that the defendants' alleged failure to count the homeless population in the 1990 decennial census violated Article I, Section 2, and Article II, Section 1 of the Constitution, the 5th and 14th amendments, the APA, and statutes relating to the census and the apportionment of Congress. Additionally, the plaintiffs contended that the defendants' actions would result in a reduction of funding for programs that benefit the homeless.

The plaintiffs requested that the court require the defendants to—

- Include a disclaimer as to the accuracy of S-Night figures on all releases of the data and provide such notice to the highest elected official of each State and local government in the United States and to the heads of relevant Federal agencies
- Recount the homeless population using such techniques as sampling and estimation and incorporate the results of this recount into the 1990 census counts
- Use these "adjusted" counts for all relevant funding allocations
- Employ similar statistical techniques to count the homeless in the 2000 decennial census

On July 15, 1993, the court heard oral arguments and instructed the parties to attempt to reach a settlement. After approximately 7 months, the plaintiffs informed the Court on January 28, 1994, that attempts to reach a settlement were unsuccessful and requested that the Court rule on all pending motions. On September 15, 1994, District Court Judge Louis Oberdorfer dismissed the suit. Citing the *Franklin* case, Judge Oberdorfer ruled that the appropriate standard of review in census cases was not the APA standard but a constitutional one. He found that the Census Bureau's

"...alleged failure to count the homeless is not tantamount to a failure to perform their constitutional duty to conduct the decennial census. The Constitution does not provide individuals with a right to be counted.... Nor did defendants discriminate against the homeless in violation of the Equal Protection Clause. Homeless persons are not a suspect class. Accordingly, plaintiffs must show intentional discrimination by the Census Bureau in order to make out an equal protection claim....[T]he undisputed facts about S-Night's development and application of special methods for counting the homeless preclude a constitutional claim of intentional neglect."

The plaintiffs appealed this decision to the U.S. Court of Appeals for the District of Columbia Circuit on October 24, 1994. As of mid-September 1995, the case was scheduled to be heard by that Court during the following month.

## Miscellaneous Issues

In *Lanoue v. Clinton*, filed in the U.S. District Court for the District of Connecticut on March 31, 1993, the plaintiffs claimed the Census Bureau's failure to include in the 1990 enumeration children born within 9 months after April 1, 1990, violated Section 2 of the 14th amendment to the Constitution. (This section states that Representatives shall be apportioned based on the whole number of persons in each State.) They sought to have the 1990 census counts "corrected" to include these individuals.

As the result of a procedural flaw in the filing of their suit, the plaintiffs voluntarily withdrew their complaint and did not refile it.

In *Clapp v. Mosbacher*, the plaintiff filed suit on May 30, 1990, in the U.S. District Court for the District of Delaware, claiming that Secretary Mosbacher had "...failed to fulfill the constitutional obligations required of the Census." (Complaint, p.1) The specific allegations were not clearly delineated. On December 30, 1991, Judge Joseph J. Longobardi ruled that the plaintiff had failed to establish standing since he could not demonstrate that he had (or would have) suffered some actual or threatened injury.

In *Sneed v. State of Illinois Board of Education*, filed on February 9, 1994, in the U.S. District Court for the Central District of Illinois, Danville Division, the plaintiffs

(including a local school district) challenged the accuracy of the Census Bureau's estimate of the number of low-income students in their school district. The Bureau produced data on the number of low-income students by school district from the sample portion of the 1990 long-form questionnaire.

The defendant National Center for Education Statistics (NCES) provided these data to State boards of education. The defendant Illinois Board of Education used these data to determine State aid entitlements for its school districts. Plaintiff St. Anne Community High School District claimed it would lose funding as a result of the use of these allegedly erroneous data and sought to prevent this loss.

On May 3, 1994, Judge Harold A. Baker granted Federal and State defendants' motions to dismiss, and, relying heavily upon the *Tucker* decision (see above), concluded that the case did not involve the adjudication of any enforceable Federal rights.

Additionally, with regard to the State defendant, the court acknowledged that it did not have the authority to tell the Illinois Board of Education which statistics to use in calculating State aid to public schools: "It would be gross intrusion upon state sovereignty and contrary to all notions of federalism for a 'federal court to instruct state officials on how to conform their conduct to state law.'" (Opinion, page 10.)

# APPENDIX 12A.

## The Census Bureau's Congressional Oversight Committees, 1983-94

### 98th Congress

1983-84

#### House Committee on Post Office and Civil Service

\*William D. Ford (D-MI)

#### Subcommittee on Census and Population

\*Robert Garcia (D-NY)  
G.T. (Mickey) Leland (D-TX)  
Mary Rose Oakar (D-OH)  
Charles E. Schumer (D-NY)  
James A. Courter (R-NJ)  
William E. Dannemeyer (R-CA)

#### Senate Committee on Governmental Affairs

\*William V. Roth, Jr. (R-DE)

#### Subcommittee on Energy, Nuclear Proliferation, and Federal Services

\*Charles H. Percy (R-IL)  
William S. Cohen (R-ME)  
David Durenberger (R-MN)  
Daniel J. Evans (R-WA)  
John C. Danforth (R-MO)  
John Glenn (D-OH)  
Carl Levin (D-MI)  
Sam Nunn (D-GA)  
(Note: Sen. Evans served on the Subcommittee until February 1984)

### 99th Congress

1985-86

#### House Committee on Post Office and Civil Service

\*William D. Ford (D-MI)

#### Subcommittee on Census and Population

\*Robert Garcia (D-NY)  
Mary Rose Oakar (D-OH)  
Gary L. Ackerman (D-NY)  
James V. Hansen (R-UT)  
John T. Myers (R-IN)  
\*Katie Hall (D-IN)

#### Senate Committee on Governmental Affairs

\*William V. Roth, Jr. (R-DE)

#### Subcommittee on Energy, Nuclear Proliferation, and Government Processes

\*Thad Cochran (R-MS)  
William S. Cohen (R-ME)  
John Glenn (D-OH)

### 100th Congress

1987-88

#### House Committee on Post Office and Civil Service

\*William D. Ford (D-MI)

#### Subcommittee on Census and Population

\*Mervyn M. Dymally (D-CA)  
Robert Garcia (D-NY)  
Gerry Sikorski (D-MN)  
Constance A. Morella (R-MD)  
Dan Burton (R-IN)

#### Senate Committee on Governmental Affairs

\*John Glenn (D-OH)

#### Subcommittee on Federal Services, Post Office, and Civil Service

\*David Pryor (D-AR)  
James R. Sasser (D-TN)  
Jeff Bingaman (D-NM)  
Ted Stevens (R-AK)  
Paul S. Trible, Jr. (R-VA)

\*Asterisk (\*) indicates chairperson.

## 101st Congress

1989-90

### House Committee on Post Office and Civil Service

\*William D. Ford (D-MI)

#### Subcommittee on Census and Population

\*Thomas C. Sawyer (D-OH)

Mervyn M. Dymally (D-CA)

Michael R. McNulty (D-NY)

Thomas J. Ridge (R-PA)

Rod Chandler (R-WA)

### Senate Committee on Governmental Affairs

\*John Glenn (D-OH)

#### Subcommittee on Government Information and Regulation

\*Herb Kohl (D-WI)

Sam Nunn (D-GA)

Carl Levin (D-MI)

Daniel K. Akaka (D-HI)

Warren B. Rudman (R-NH)

William S. Cohen (R-ME)

John Heinz (R-PA)

## 102nd Congress

1991-92

### House Committee on Post Office and Civil Service

\*William L. Clay (D-MO)

#### Subcommittee on Census and Population

\*Thomas C. Sawyer (D-OH)

Mervyn M. Dymally (D-CA)

Michael R. McNulty (D-NY)

Thomas J. Ridge (R-PA)

Rod Chandler (R-WA)

### Senate Committee on Governmental Affairs

\*John Glenn (D-OH)

#### Subcommittee on Government Information and Regulation

\*Herb Kohl (D-WI)

Sam Nunn (D-GA)

Carl Levin (D-MI)

Joseph I. Lieberman (D-CT)

Warren B. Rudman (R-NH)

William S. Cohen (R-ME)

John Seymour (R-CA)

## 103rd Congress

1993-94

### House Committee on Post Office and Civil Service

\*William L. Clay (D-MO)

#### Subcommittee on Census, Statistics, and Postal Personnel

\*Thomas C. Sawyer (D-OH)

Frank McCloskey (D-IN)

Albert R. Wynn (D-MD)

Thomas Petri (R-WI)

Thomas J. Ridge (R-PA)

### Senate Committee on Governmental Affairs

\*John Glenn (D-OH)

#### Subcommittee on Regulation Government Information

\*Joseph I. Lieberman (D-CT)

Byron L. Dorgan (D-ND)

Sam Nunn (D-GA)

Carl Levin (D-MI)

Thad Cochran (R-MS)

William S. Cohen (R-ME)

John McCain (R-AZ)

\*Asterisk (\*) indicates chairperson.

# APPENDIX 12B.

## Summary of Litigation Relating to the 1990 Census of Population and Housing

| Abbreviated case title,<br>date filed, court in which<br>case filed  | Principal Plaintiffs  | Issue(s)  | Resolution   |
|--|---|---|--|
| <b><i>Ridge v. Verity</i></b><br>February 18, 1988<br>U.S. District Court for the<br>Western District of<br>Pennsylvania   | Congressman Thomas J.<br>Ridge and 41 other<br>Members of Congress;<br>States of Alabama, Kansas,<br>and Pennsylvania, and 2<br>advocacy organizations  | Inclusion of illegal aliens in<br>the 1990 decennial census<br>counts used to apportion<br>the U.S. House of<br>Representatives | U.S. District Court ruled in<br>favor of the Census Bureau<br>on May 8, 1989   |
| <b><i>City of New York v. U.S.<br/>Department of Commerce</i></b> <sup>1</sup><br>November 3, 1988<br>U.S. District Court for<br>the Eastern District of<br>New York | States of Arizona,<br>California, <sup>2</sup> Florida, New<br>Jersey, New Mexico, New<br>York, and Texas; Counties<br>of Broward and Dade<br>(Florida), Hudson (New<br>Jersey), <sup>2</sup> and Los Angeles<br>and San Bernardino<br>(California); Cities of<br>Baltimore, Boston, Chicago,<br>Cleveland, Denver, Houston,<br>Inglewood, Long Beach, Los<br>Angeles, New Orleans, New<br>York, Oakland, Pasadena,<br>Philadelphia, San Antonio,<br>San Francisco, San Jose,<br>Tucson, and Washington,<br>DC; the Council of Great<br>City Schools, League of<br>United Latin American<br>Citizens, National<br>Association for the<br>Advancement of Colored<br>People, National League of<br>Cities, Navajo Nation, and<br>U.S. Conference of Mayors;<br>and 10 individuals | Adjustment  | Case to be argued before<br>the U.S. Supreme Court<br>during the fall 1995-spring<br>1996 term   |
| <b><i>Tucker v. U.S. Department<br/>of Commerce</i></b><br>March 27, 1990<br>U.S. District Court for<br>the Northern District<br>of Illinois                         | Robert L. Tucker and<br>10 other individuals  | Adjustment  | On March 16, 1992, the U.S.<br>Court of Appeals for the<br>Seventh Circuit upheld the<br>U.S. District Court's ruling in<br>favor of the Census Bureau;<br>U.S. Supreme Court declined<br>to hear the case |
| <b><i>Clapp v. Mosbacher</i></b><br>May 30, 1990<br>U.S. District Court for the<br>District of Delaware  | Leonard H. Clapp  | Conduct of the decennial<br>census as it related to voter<br>qualification data   | U.S. District Court dismissed<br>the case on December 30,<br>1991  |

See footnotes at end of table.

| Abbreviated case title, date filed, court in which case filed  | Principal Plaintiffs   | Issue(s)   | Resolution  |
|--|--|--|---|
| <p><b><i>City of Atlanta v. Mosbacher</i></b><br/>December 21, 1990<br/>U.S. District Court for the Northern District of Georgia</p>                     | <p>City of Atlanta, GA, and Maynard Jackson (individually and as Mayor of Atlanta)</p>   | <p>Adjustment</p>  | <p>U.S. District Court dismissed the case on February 24, 1992; plaintiffs were ordered to intervene in the <i>City of New York</i> case (see above)</p>                                    |
| <p><b><i>District of Columbia v. U.S. Department of Commerce</i></b><br/>January 25, 1991<br/>U.S. District Court for the District of Columbia</p>       | <p>District of Columbia</p>  | <p>Application of “usual residence rules” to include inmates of Lorton Prison (located in Virginia) in the population count for the Commonwealth of Virginia and not in the District of Columbia’s count</p>               | <p>U.S. District Court ruled in favor of the Census Bureau on April 3, 1992</p>   |
| <p><b><i>Meña v. Franklin</i></b><br/>February 7, 1991<br/>U.S. District Court for the Southern District of Texas</p>                                    | <p>Guadalupe Meña, 29 other individuals, and 1 advocacy organization</p>   | <p>Adjustment, for the purposes of allocating seats in U.S. House of Representatives to Texas, and Texas State redistricting</p>   | <p>On September 26, 1991, this case was consolidated with <i>State of Texas v. Franklin</i> (see below); as of September 1995, the consolidated case was pending in U.S. District Court</p> |
| <p><b><i>City of Chicago v. U.S. Department of Commerce</i></b><br/>February 27, 1991<br/>U.S. District Court for the Northern District of Illinois</p>  | <p>City of Chicago and Richard M. Daley (individually and as Mayor of Chicago)</p>   | <p>Census design, implementation, and results for Chicago</p>  | <p>U.S. District Court dismissed this case on May 21, 1991</p>  |
| <p><b><i>State of Washington v. U.S. Department of Commerce</i></b><br/>March 7, 1991<br/>U.S. District Court for the Western District of Washington</p> | <p>State of Washington, Ralph Munro (Secretary of State of Washington), and Ken O. Eikenberry (Attorney General of Washington)</p> | <p>Preventing the Census Bureau from adjusting the 1990 decennial census</p>   | <p>U.S. District Court dismissed the case against executive branch defendants on October 29, 1991; subsequently, the case was dismissed altogether</p>                                      |
| <p><b><i>City of Toccoa, GA v. U.S. Department of Commerce</i></b><br/>March 29, 1991<br/>U.S. District Court for the Northern District of Georgia</p>   | <p>City of Toccoa, GA, 45 other GA cities, 11 GA counties, the Mayor and Aldermen of Savannah, and 1 other individual</p>          | <p>Adjustment</p>  | <p>U.S. District Court dismissed this case</p>  |
| <p><b><i>Commonwealth of Massachusetts v. Mosbacher</i></b><br/>May 1, 1991<br/>U.S. District Court for the District of Massachusetts</p>                | <p>Commonwealth of Massachusetts, and two individuals</p>  | <p>Inclusion of Federal employees stationed overseas (and their dependents) in the census counts used for apportioning the U.S. House of Representatives; constitutionality of equal proportions apportionment formula</p> | <p>U.S. Supreme Court ruled in Census Bureau’s favor on June 26, 1992</p>   |

See footnotes at end of table.



| Abbreviated case title, date filed, court in which case filed  | Principal Plaintiffs  | Issue(s)   | Resolution  |
|--|---|--|---|
| <b>State of Montana v. Mosbacher</b><br>May 22, 1991<br>U.S. District Court for the District of Montana  | State of Montana, Stan Stephens (Governor of Montana), Marc Racicot (Attorney General of Montana), Mike Cooney (Secretary of State of Montana), Max Baucus and Conrad Burns (U.S. Senators), and Pat Williams and Ron Marlenee (U.S. Representatives) | Constitutionality of the equal proportions formula for apportioning seats in the U.S. House of Representatives | U.S. Supreme Court ruled in favor of the Census Bureau on March 31, 1992  |
| <b>State of Wisconsin v. U.S. Department of Commerce</b><br>June 17, 1991<br>U.S. District Court for the Western District of Wisconsin   | State of Wisconsin  | Preventing the Census Bureau from adjusting the 1990 census  | Plaintiff voluntarily withdrew suit on July 25, 1991; on September 10, 1991, Wisconsin intervened as a defendant in the <i>City of New York</i> case (see above)  |
| <b>Assembly of the State of California v. U.S. Department of Commerce</b><br>July 25, 1991<br>U.S. District Court for the Eastern District of California                                   | Assembly of the State of California and the Speaker, Willie L. Brown; its Committee on Elections, Reapportionment, and Constitutional Amendments, and Committee Chairman, Peter R. Chacon   | Release of adjusted redistricting data tapes for California  | On July 1, 1992, the U.S. Court of Appeals for the Ninth Circuit upheld the U.S. District Court's February 7, 1992 order that the Census Bureau release the adjusted redistricting data tapes for CA  |
| <b>City of Detroit v. Mosbacher</b><br>July 25, 1991<br>U.S. District Court for the Eastern District of Michigan   | City of Detroit and Coleman A. Young (individually and as Mayor of Detroit)   | Census design, implementation, and results for Detroit; adjustment of Detroit's 1990 Decennial Census count    | On September 22, 1993, the U.S. Court of Appeals for the Sixth Circuit affirmed the U.S. District Court's ruling in favor of the Census Bureau; the U.S. Supreme Court declined to hear the case  |
| <b>Senate of California v. Franklin</b><br>July 31, 1991<br>U.S. District Court for the Eastern District of California   | Senate of the State of California and its President <i>pro tempore</i> , David Roberti; Milton Marks and Bill Greene (California State Senators), and two other individuals   | Release of adjusted redistricting data tapes for California  | On July 6, 1992, the U.S. Court of Appeals for the Ninth Circuit reversed the U.S. District Court's ruling ordering the release of the adjusted data tapes to the California Senate   |
| <b>State of Texas v. Franklin</b><br>August 28, 1991<br>U.S. District Court for the Southern District of Texas   | State of Texas (and the Meña plaintiffs (see above) following the consolidation of the two cases)   | Adjustment (for distribution of Federal funds)   | As of September 1995, this case was pending in U.S. District Court  |
| <b>Florida House of Representatives, Honorable T.K. Wetherell, Speaker, v. U.S. Department of Commerce</b><br>October 10, 1991<br>U.S. District Court for the Northern District of Florida | Florida House of Representatives and its Speaker, T.K. Wetherell  | Release of adjusted redistricting data tapes for Florida   | On May 27, 1992, the U.S. Court of Appeals for the Eleventh Circuit ruled in favor of the Census Bureau, reversing the U.S. District Court's January 9, 1992 decision requiring the Census Bureau to release the adjusted redistricting tapes for Florida to the plaintiffs |

See footnotes at end of table.

| Abbreviated case title, date filed, court in which case filed   | Principal Plaintiffs   | Issue(s)   | Resolution  |
|---|--|--|---|
| <b>Florida House of Representatives v. Mosbacher</b><br>December 19, 1991<br>U.S. District Court for the Northern District of Florida     | Florida House of Representatives and nine of its members, including the Speaker, T.K. Wetherell; Florida State Conference of the National Association for the Advancement of Colored People; and three other individuals | Adjustment of the 1900 decennial census; release of the adjusted redistricting data for Florida  | On April 8, 1992, the U.S. District Court granted the defendants' request for a change of venue to the Eastern District of New York; on June 6, 1992, this case was consolidated with the <i>City of New York</i> lawsuit (see above) |
| <b>National Law Center on Homelessness and Poverty v. Franklin</b><br>October 8, 1992<br>U.S. District Court for the District of Columbia | National Law Center on Homelessness and Poverty, U.S. Conference of Mayors, City of Baltimore, City and County of San Francisco, 15 advocacy organizations, and 11 individuals   | Design, implementation, and results of 1990 decennial census S-Night operation; use of S-Night results to allocate funds for programs that benefit homeless people | As of September 1995, this case was pending before the U.S. Court of Appeals for the District of Columbia Circuit   |
| <b>Lanoue v. Clinton</b><br>March 31, 1993<br>U.S. District Court for the District of Connecticut   | Spencer Roff Lanoue and 14 other individuals   | Constitutionality of Census Bureau rules stipulating that people born after April 1 of the census year are not included in that year's census count                | Plaintiffs voluntarily withdrew their suit on June 28, 1993   |
| <b>Sneed v. State of Illinois Board of Education</b><br>February 9, 1994<br>U.S. District Court for the Central District of Illinois      | Jeremiah Sneed, five other individuals, and St. Anne Community High School District No. 302  | Accuracy of 1990 census sample data on low-income students by school district  | U.S. District Court dismissed this suit on May 3, 1994  |

<sup>1</sup>*City of Atlanta v. Mosbacher and Florida House of Representatives v. Mosbacher* (see below) were consolidated with this suit on May 6 and June 6, 1992, respectively.

<sup>2</sup>The State of California and (intervenor) Hudson County, New Jersey, did not join in the plaintiffs' July 6, 1993, notice of appeal to the U.S. Court of Appeals for the Second Circuit.

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# CHAPTER 13.

## Puerto Rico, Virgin Islands, and the Pacific Island Territories

### INTRODUCTION

#### Legal Authority

Title 13 of the U.S. Code states that each of the censuses it authorizes "shall include each State, the District of Columbia, the Virgin Islands [of the United States], Guam, the Commonwealth of the Northern Mariana Islands (CNMI), and the Commonwealth of Puerto Rico, and as may be determined by the Secretary [of Commerce], such other possessions and areas over which the United States exercises jurisdiction, control, or sovereignty. Inclusion of other areas ... shall be subject to the concurrence of the Secretary of State."

Accordingly, for the 1990 Census of Population and Housing, the Bureau of the Census enumerated and tabulated data for these political entities, plus American Samoa and the Republic of Palau, treating each one as the statistical equivalent of a State to be consistent in its data presentations and tabulations (see table 1). All except Palau were included in the 1987 census of agriculture, but only American Samoa and the CNMI were done at the same time as the 1990 decennial census. Both American Samoa and Palau participated in the 1987 economic censuses. For Midway Islands, Johnston Atoll, and Wake Island, the Bureau of the Census obtained population counts from the Department of Defense. Kingman Reef, Navassa Island, and Palmyra Atoll were unpopulated; no population characteristics were collected, tabulated, or published. Note that these territories under the U.S. jurisdiction were not included in the economic or agricultural censuses.

#### HISTORICAL BACKGROUND

Early in the 20th century, the Census Bureau began using the term "outlying area" to refer to any place under "U.S. sovereignty or control" outside the area now comprising the contiguous 48 States and the District of Columbia. Thus, the reference originally applied to Alaska and Hawaii, now among the 50 States.<sup>1</sup> In recent years, data collection and products for the population and housing

<sup>1</sup>After the United States acquired Alaska from Russia in 1867, the War Department took a census of Sitka in 1870; Alaska then was enumerated in the 1880 and subsequent U.S. decennial censuses. Following its annexation in 1898, Hawaii (where the local government took a census every 6 years from 1866 through 1896) was included in the 1900 census, which also had the first count of the U.S. population abroad. For further information on early U.S. censuses, see U.S. Bureau of the Census, *200 Years of U.S. Census Taking: Population and Housing Questions, 1790-1900*, Washington, DC 1989.

Table 1. 1990 Population Counts for Puerto Rico, Virgin Islands, and the Pacific Outlying Areas

| Name   | Population |
|--|------------|
| Puerto Rico .....                                      | 3,522,037  |
| Virgin Islands .....                                   | 101,809    |
| Pacific Outlying Areas (totals) .....                  | 238,585    |
| Guam .....   | 133,152    |
| American Samoa .....                                   | 46,773     |
| Northern Mariana Islands .....                         | 43,345     |
| Palau .....  | 15,122     |
| Territories under U.S. jurisdiction <sup>1</sup> ..... | 193        |

<sup>1</sup>Johnston Atoll (173), Midway Islands (13), Wake Island (7), Baker, Howland, and Jarvis Islands; Kingman Reef; and Palmyra Atoll (0).

censuses of Puerto Rico and the U.S. Virgin Islands have come to resemble more closely that of the 50 States, whereas a greater degree of adaptation continues to exist for the specific needs in the remaining outlying areas.

Spain ceded the island of Puerto Rico to the United States in 1898. Prior to then, Spain had taken censuses in Puerto Rico at irregular intervals between 1765 and 1887. The U.S. War Department took a special census of Puerto Rico in 1899. Puerto Rico, which became a commonwealth in 1952, has been included in every U.S. decennial census since 1910. Beginning in 1960, the census of population and housing of the Commonwealth of Puerto Rico was conducted as a joint project of the U.S. Bureau of the Census and the Puerto Rico Planning Board (PRPB). The Bureau was responsible for the data collection, and PRPB provided input on content and data needs.

The Danish Government took periodic censuses (between 1835 and 1911) of the Virgin Islands before the United States acquired them in 1916. There was a special Federal census in 1917. The islands were included in the 1930 and all subsequent U.S. decennial censuses.

**Territories under the U.S. jurisdiction**—Beginning in 1980, the Department of Defense provided the Bureau with population counts for Johnston Atoll and for Midway and Wake Islands. This marked a shift from the Bureau's previous procedure of enumerating the populations of these islands separately. Midway Island was enumerated for the first time in 1930, when its population was included with that of Hawaii. In 1940, the Hawaiian census included Johnston Atoll and Midway, Canton, Enderbury, Baker, Howland, and Jarvis Islands; the latter three islands were uninhabited in 1950, 1960, 1970, and 1980. Canton and Enderbury Islands were uninhabited in 1970 and 1980, but the former was populated in 1960, and both were inhabited in 1950. Neither the Swan Islands nor the Canal Zone were enumerated in 1980. Sovereignty over the Swan Islands

passed to Honduras in September 1972 under the terms of a treaty signed in November 1971. On October 1, 1979, the United States transferred sovereignty over the Canal Zone to Panama in accordance with the terms of a treaty signed in September 1977 and ratified the following April. Fletcher's Island, a drifting slab of shelf ice in the Beaufort Sea off the northern coast of Alaska, once used by the U.S. Navy, was enumerated in 1970 but not in 1980.

**Other areas**—Elsewhere in the Caribbean, U.S. censuses have included such entities as Navassa Island (a U.S. possession since 1856 and the site of a lighthouse under Coast Guard jurisdiction); the Corn Islands (reverted to Nicaragua in 1971); Quita Sueo Bank, Roncador Cay, and Serrana Bank (all transferred to Colombia in 1973); and the Swan Islands (passed to Honduras in 1972).

The Census Bureau took a census of Cuba in 1907 under a provisional U.S. administration. There were earlier periodic censuses under Spanish rule, which ended in 1898. The U.S. War Department also conducted a census in 1899. Subsequent censuses were carried out by the Republic of Cuba (established in 1901), beginning in 1919.

Following U.S. acquisition of American Samoa in 1900, the Governors directed censuses at various times. The population was enumerated in the 1920 and all subsequent decennial censuses; coverage of housing began in 1960.

The first enumeration of the population of Guam, after U.S. Government occupation in 1899, occurred in 1901 under the direction of the second Naval Governor. The Governor's annual reports included population statistics in subsequent years. Guam was included in the U.S. decennial census of population for the first time in 1920 and has participated in the decennial housing census since 1960.

The CNMI and the Republic of Palau were enumerated in the 1990 census. The CNMI was included in the 1980 decennial census and Palau in the Trust Territory of the Pacific Islands (TTPI). For earlier censuses, both were part of the TTPI. The United States administered that area, which covered the Marshall, Caroline, and Northern Mariana Islands, as a United Nations trusteeship beginning in 1947. There had been quinquennial Japanese censuses in these islands from 1920 to 1940. The U.S. Navy enumerated the TTPI in 1950. The Office of the High Commissioner of the TTPI took a census in 1958, and the Census Bureau did so as part of the 1970 and 1980 decennial censuses. (Disagreeing with the 1970 census results, the High Commissioner's office reconvassed the TTPI in 1973.) The 1980 U.S. census enumerated and reported the Commonwealth of the Northern Mariana Islands as a separate entity rather than with the other entities that comprised the TTPI. The trusteeship agreement ended in 1986 with the Northern Marianas becoming a commonwealth of the United States, and the Marshall Islands and the Federated States of Micronesia becoming "freely associated states independent of the United States" except for U.S. responsibility for their security and defense. In December 1990, the United Nations Security Council officially terminated TTPI jurisdiction over all areas except Palau.

Following their accession in 1898, the United States compiled and published one census of the Philippine Islands; this was taken under the direction of the Philippine Commission in 1903. Under Spanish rule, there had been censuses in 1818 and 1876. The Philippine legislature directed a census in 1918, and the Commonwealth's statistical office began periodic enumerations in 1939. The Philippines became an independent republic in 1946.

## PUERTO RICO

The 1990 census in Puerto Rico was planned with the direct cooperation of the Commonwealth Government, represented by the Puerto Rico Planning Board (PRPB). Implementation of census planning, data collection, and the post-enumeration survey (PES)<sup>2</sup> was the responsibility of the Bureau's Field Division (FLD), which modified some of the U.S. census methodology to accommodate differences between Puerto Rico and the stateside United States.

1990 decennial highlights for Puerto Rico included—

- The Bureau created the Topologically Integrated Geographic Encoding and Referencing (TIGER) System, which provided products used to control the enumeration and tabulation. TIGER provided several of these products; there were maps, both for collection of data and for the tabulated results; and there were "address matching" abilities (even though Puerto Rico was enumerated by conventional means, the Bureau still used information from other operations). TIGER also contained the geographic frame that produced the geographic reference files that drove the collection of data and the tabulation of the results.
- Questionnaires generally followed the stateside versions (there were both a short and a long form) but had modifications to accommodate socioeconomic, cultural, and climatic differences as outlined under the provisions of the 1958 agreement described in the next section.
- Census district office boundaries were delineated based on 1984 population estimates, which projected 1.1 million housing units in 1990.
- All public-use forms and selected field enumeration and processing materials were produced both in English and Spanish.
- Data were collected using the list/enumerate (L/E) method and a 1-in-6 sample for the long form.
- Coverage improvement operations included unit-status review, multiunit check, and postcensus local review, followed by coverage evaluations.
- There was a content edit of the questionnaires.

<sup>2</sup>A PES was conducted in Puerto Rico for the first time in 1990.

- The outreach and promotion program<sup>3</sup> included state-side materials adapted and translated into Spanish for distribution on the island as well as outreach materials adapted for Puerto Rico such as the Education Project.
- Questionnaires were keyed and clerically coded at the Jacksonville Processing Office (JXPO).
- The tabulation and publication (TAB/PUB) program was comparable in scope to the 1990 stateside program. This included summary tape files (STF's) and printed reports that were published in both English and Spanish. Other files included in the program were public-use microdata sample (PUMS), equal employment opportunity (EEO), STF420 and place of work destination. There was also a file for redistricting purposes equivalent to the PL 94-171 files prepared for the States and a special tabulation CPH-L-155.

### Special Agreement With the Commonwealth Government

In October 1958, the Bureau of the Census and the Commonwealth government concluded a special agreement concerning the censuses in Puerto Rico. The basic purposes of the agreement were to assure the efficient operation of the census program, to provide the Commonwealth with a large share of the responsibility for planning the census, and to assure full consideration of its unique statistical needs. Each census thereafter conformed to the basic 1958 agreement with subsequent amendments. Governors of Puerto Rico regularly directed the PRPB to serve as the coordinating agency for the census operations.

On September 5, 1989, the Director of the Census Bureau signed the amendment to the agreement for the 1990 Census of Population and Housing, and on November 6, 1989, the PRPB's chairperson added her signature. Some of the major provisions of this agreement were as follows:

- The Bureau would bear all costs of the 1990 census in Puerto Rico.
- The long form population and housing items would be covered on a 1-in-6 sample basis.
- The Bureau would open a temporary area office (AO) and nine district offices (DO's) in Puerto Rico from which to supervise and coordinate the census enumeration, and before that, a translation office in Puerto Rico where staff would translate field manuals, training guides, and other related materials. The manager of the AO was a permanent Bureau employee, while managers of the DO's were temporary.
- The Bureau would hire and train approximately 10,000 to 11,000 temporary employees: including enumerators,

crew leaders, clerks, supervisors, and managers; establish pay rates; prepare and distribute maps, supplies, equipment, and questionnaires; conduct field enumeration activities; and process, tabulate, and publish the data.

- The Bureau would consult with the Planning Board, other commonwealth agencies, a number of advisory groups, and other data users on such issues as questionnaire content, tabulation categories, and the publications program.
- The Commonwealth government would assist the Bureau in publicizing the census, collecting map and boundary information, designating appropriate statistical areas, and identifying candidates for field positions.

### Overview of Geographic Changes for 1990

For the 1990 census for the United States and its territories, including Puerto Rico, the Bureau created TIGER, a digital computer-readable geographic data base that automated the mapping and related geographic products required to support the Bureau's decennial censuses and survey programs. Using this data base, all of Puerto Rico—like the United States and the other territories—was divided into geographic units called census blocks that were used for collection through tabulation.

Island-wide block numbering for collection and tabulation of the 1990 census had several effects on the planning, field collection, and publication aspects of the census. The number of census blocks tabulated in Puerto Rico rose from 15,700 in 1980 to approximately 50,000 in 1990, more than a threefold increase. Since census blocks were tabulated for the whole island, enumeration districts (ED's) were eliminated as tabulation units and replaced with block groups (BG's) and blocks for data dissemination. Also by tabulating data for all blocks, data users could independently aggregate census blocks to define their own statistical areas and receive tabulation data profiles and maps based on these user-defined areas from the Bureau on a cost-reimbursable basis. (See ch. 10, User-Defined Areas Program.)

Several changes were made to the geographic terminology for Puerto Rico for 1990. (See appendix 13D.) The minor civil division equivalent, "pueblo," was changed to "barrio-pueblo." (A barrio is the area from which municipio officials and the Commonwealth legislature are elected; a municipio is the statistical equivalent of a county.) The barrio-pueblo is differentiated from other barrios as the historical center and seat of its municipio. The place equivalent was changed from "aldea" to "comunidad." "Zona urbana" remained for the municipio seat of government and adjacent built-up area. In agreement with the Commonwealth government, the term "ciudad" was deleted for the 1990 census.

Another major change for the 1990 census was that all maps showed uniform terminology in Spanish. All feature

<sup>3</sup>The 1990 PR Promotion Campaign was the first one produced by an agency on the island and was specifically designed for Puerto Rico.



names and landmarks were consistently labeled in Spanish unless they were part of U.S. military installations or if English names were actually used. In previous censuses, English and Spanish terms often were used interchangeably.

### **Divisional Responsibility for Conducting the 1990 Census**

The Decennial Planning Division (DPLD) and the FLD coordinated support and administrative activities at Bureau headquarters in Suitland, MD. The FLD, through the area office manager in Puerto Rico, directed the onsite program. The Administrative and Publications Services Division (APSD), the Population Division (POP), the Housing and Household Economic Statistics (HHES) Division, and the Statistical Support Division (STSD) provided advice and technical assistance as needed on the development of questionnaire format and content, sampling procedures, tabulation plans, and publications.

The FLD coordinated the logistics of acquiring space and equipment for the nine DO's; translated the field manuals and training materials; and recruited, selected, and trained the field staff who collected the data. The Geography Division (GEO), with support from the FLD and the Geography Branch/Data Preparation Division (GB/DPD), obtained boundary and other geographic information and prepared all census maps and related geographic materials.

### **Planning**

Formal planning for 1990 started in 1984 with the formation in the Bureau of a subcommittee for Puerto Rico and the outlying areas within the DPLD's 1990 Census Committee on Special Enumeration Procedures. The subcommittee identified the issues related to Puerto Rico and made general recommendations. One recommendation was to test new questions and new procedures to be implemented for 1990 at least 2 to 3 years before Census Day to allow enough time for evaluating results. For lack of funding, such testing never occurred. (In January 1985, the DPLD organized the 1990 Puerto Rico Task Force, with representatives from the POP, HHES, STSD, FLD, GEO, the Data User Services Division (DUSD), and the Decennial Operations Division (DOD). The main purpose of the task force was to analyze the 1980 experience and consider the various procedures, with the main goals of improving coverage, reducing costs, and producing data products in a more timely manner for 1990.)

In April 1984, representatives from the Planning Board met with the Bureau staff in Washington, DC, as part of the National Geographic Areas Conference to discuss geographic support issues relative to the decennial census. In December 1984, the DPLD developed a program plan for the census of Puerto Rico which identified all the issues and actions required and the divisions responsible for these actions. This program plan was widely circulated for comments throughout the Bureau before it was finalized

and distributed. Planned and coordinated by the DUSD and the Puerto Rico Census Data Center, a local public meeting was held in San Juan on March 5, 1985. Over 140 representatives from various Commonwealth government agencies, academia, and private organizations participated and heard Bureau personnel discuss the general plans for 1990.

In October 1985, the Bureau asked the Planning Board to organize an interagency committee with representatives from the appropriate Commonwealth organizations to make recommendations on the 1990 questionnaire content, preliminary plans, geographic issues, and data products. The PRPB hosted several meetings in Puerto Rico during the week of June 16-20, 1986, with officials of the Commonwealth government, interagency committee members, and Bureau staff to review census plans and discuss previously distributed issue papers outlining options for 1990 population and housing questions and data uses. The Bureau sent committee members another paper on population and housing issues in October 1986 and received final recommendations early in 1987. The Bureau ultimately incorporated many of these suggestions into the 1990 Puerto Rico questionnaire, keeping such items as parental birthplace, the ability to speak Spanish and/or English, literacy, and the type of fuel used for cooking.

The 1990 planning process also included a joint FLD and DPLD conference in December 1986 to review the 1980 enumeration of Puerto Rico and recommend procedures for 1990. The participants discussed the feasibility of a mailout/mailback operation in selected areas. Based on the results of this conference and subsequent meetings, the recommendation was made to conduct the entire 1990 census in Puerto Rico using the L/E procedure. (See L/E operation and ch. 6 for details.)

The House of Representatives Committee on the Post Office and Civil Service's Subcommittee on Census and Population,<sup>4</sup> chaired by Congressman Robert Garcia (D-NY), held a hearing in Puerto Rico on January 6, 1986, to examine how censuses were taken on the island. The subcommittee heard how the operations and procedures used in 1980 differed from those used stateside and discussed plans for the 1990 census of Puerto Rico. It also met with the chief justice of the Puerto Rico Supreme Court to discuss block definition issues as they related to election districts. To ensure the ability to tabulate data for these entities, the Bureau offered Puerto Rico the opportunity to participate in the "Block Boundary Definition Project," which allowed them to determine election district boundaries that needed to be held as block boundaries.

In June 1987, the Bureau's Assistant Director for Decennial Census visited Puerto Rico and met with various officials to discuss the implementation of the Governor's offer of participation in the outreach program. (See "Promotional Program.") Planning continued through 1989

<sup>4</sup>In 1993, the subcommittee's name was changed to "Census, Statistics and Postal Personnel."

among Bureau, Planning Board, and local officials on questionnaire content and format, data collection and processing, and promotion.

## Field Office Organization

**Regional Census Center (RCC)**—The Bureau's New York RCC oversaw operations in Puerto Rico's AO and nine DO's. The RCC personnel leased the DO space, trained key DO managers and automation personnel, monitored the cost and progress of DO operations, processed the DO payrolls, and had the responsibility for assuring timely completion and acceptable quality of field work.

In carrying out this management responsibility, the assistant regional census manager was under the New York regional director and had the assistance of an administrative supervisor, an automation supervisor, and the area manager for Puerto Rico. In addition, there was a census recruiter, census information specialist, geographic coordinator, Census Awareness Products and Program (CAPP) coordinator, media specialist, and an EEO specialist (all staff except the assistant regional census manager and the CAPP coordinator were based out of the Puerto Rico AO.)

Liaison with the DO's was carried out through the area manager and his regional technicians. The area manager position was used both in 1980 and 1990; it was established to facilitate contact among the RCC's and their DO's. Area managers were the direct supervisors of the DO managers. They trained the managers and were the primary source of information on operational stages of the census.

**Area office configuration**—The area office, located in San Juan, operated as a mini-RCC, as an extension of the New York RCC. In this capacity, it provided technical assistance to the DO's. The AO technicians helped the DO's set up and maintain computer equipment and provided technical support on geography, data collection, and the post-census local review program. The AO also helped the DO's process personnel appointments, do payroll, set up and maintain recruiting files, and compile cost and progress reports. As in the stateside DO's, these operations were automated. Management information system reports were processed at the DO level, but forwarded to the RCC via the AO.

The AO staff consisted of seven people: an area manager and six technicians (three specialists for the AO and three generalists for the DO's). As noted before, the area manager was the direct supervisor of the DO managers and was the primary source of information during the operational stages of the census. Three AO technicians—a geography specialist, an administrative specialist (whose duties were performed by the assistant area manager) and a computer specialist—assisted the area manager and the DO's. Although these technicians served as advisors to the managers, they sometimes had line authority in the DO's to handle unusual situations. (When necessary, the area

manager could call on the regional technicians in New York for assistance.) In addition, there were three DO technicians (each responsible for three DO's) and three outreach specialists, who were recruited and hired locally in Puerto Rico. One of them was a CAPP team leader who reported directly to the area manager and supervised the activities of the other specialists (e.g., media specialist).

The allocation for the area office technician staff was part of the overall plan for the New York RCC. Since the island was geographically distant, the AO geographer, administrative technician, and computer technician received their training from the RCC, where they could benefit from contact with experienced Bureau staff. Although the technician for administration was assigned some of the duties for recruiting, there was no full-time technician for recruiting, as in the RCC.

**District office configuration**—Each of the nine DO's was to enumerate approximately 125,000 housing units. This configuration was comparable to the 1980 census, for which there were 8 DO's with an average housing unit coverage of 124,200 except for the San Juan municipio. (The housing unit workload in Puerto Rico DO's was not comparable to the stateside type 3 DO's 215,000 housing units per DO because of the higher geographic density on the island.) For San Juan, the Bureau set up two DO's because of greater difficulties in collecting data and recruiting personnel. The inner-city area also had to contend with a high crime rate, many buildings that had secured access to occupants only, and a large number of households with both spouses working outside the house. Table 2 reflects the DO workloads in 1980 and 1990.

Table 2. District Office Workloads

| District office location |             | Number of housing units |         |
|--------------------------|-------------|-------------------------|---------|
| 1990                     | 1980        | 1990                    | 1980    |
| San Juan 1               | San Juan 1  | 93,700                  | 104,948 |
| San Juan 2               | San Juan 2  | 91,600                  | 117,775 |
| Bayamón                  | Bayamón     | 138,700                 | 115,544 |
| Arecibo                  | Arecibo     | 139,000                 | 133,403 |
| Aguadilla                | Aguadilla   | 112,600                 | 139,367 |
| Ponce                    | Ponce       | 142,600                 | 132,686 |
| Carolina                 | Carolina    | 137,900                 | 128,587 |
| Caguas                   | San Lorenzo | 137,300                 | 121,368 |
| Mayagüez                 |             | 121,900                 | *       |
| Total                    |             | 1,115,300               | 993,678 |
| Average office size      |             | 123,922                 | 124,210 |

\* In 1980, Mayagüez (1990) was handled by the Aguadilla DO.

The district office authorization file provided DO managers with authorized staffing levels and expenses for each operation. The allowable staffing levels and expenses varied as the workloads changed. However, staffing and wages for the DO's were similar to enumeration pay scales. (See table 3 below for Puerto Rico DO positions and wages.)

**Table 3. District Office Positions and Wages**

| Position  | Pay rates |
|---|-----------|
| District office manager*                          | \$14.30   |
| Assistant manager field operations*               | 9.90      |
| Assistant manager office operations*              | 8.25      |
| Assistant manager administration*                 | 8.25      |
| Administrative assistant*                         | 5.50      |
| Assistant manager recruiting*                     | 8.25      |
| Assistant manager for electronic data processing* | 8.80      |
| EDP operations supervisor                         | 8.25      |
| Special place operation supervisor                | 7.98      |
| Field operations supervisor                       | 7.98      |
| Crew leader                                       | 6.88      |
| Enumerator  | 6.05      |
| Supervisory office clerk                          | 5.78      |
| Administration/collection clerk                   | 5.28      |
| Stock and supply assistant                        | 5.50      |
| Data transcriber                                  | 5.28      |
| Supervisory data transcriber                      | 5.78      |
| Office operations supervisor                      | 7.98      |

\*Full-time employees paid biweekly.

Staff were paid \$0.225 for each mile driven on official business, including training. Employees involved in travel were reimbursed for tolls, bus fares, parking fees, official telephone calls, and similar expenses incurred while carrying out their duties. There were no piece rates in Puerto Rico for 1990 or supplemental payment awards; however, all employees received a nonforeign-area cost of living allowance of 10 percent, as established by the Office of Personnel Management (OMB). The additional 10 percent was based on the employee's regular salary, which did not include earnings from overtime hours or other premium hours. (See stateside payroll and reporting procedures in chapter 6 for further details.)

### Logistics

**Leasing**—The process of leasing DO space was similar to that for stateside DO's. (See Chapter 6, "Field Enumeration," for details.) The statutory authority to enter into leases for real property and manage leased space was vested in the Administrator of the General Services Administration (GSA) by the Federal Property and Administrative Services Act of 1949, 63 Stat. 377, as amended. At the Secretary of Commerce's request, the GSA delegated authority to lease space required for the 1990 decennial census to the Department of Commerce, which redelivered it to the Bureau.

The Puerto Rico AO staff, working with the New York RCC's contracting officers, negotiated the Puerto Rico DO space leases. After determining the DO requirements and locations, they placed advertisements in local newspapers within each area to locate suitable facilities for the required space. They recorded each response received on a Form D-4000, Lease Advertisement Response. If the space either met or was capable of meeting the requirements, they sent the owner/agent a sample lease package containing the standard clauses; if not, the owner/agent was so advised. Following the signing of the lease by the lessor and the Government, the contracting officer gave the lessor

space layouts, paint colors, carpet selections, etc., for "buildout." Various inspections followed, with a final inspection made jointly by the leasing specialist and the lessor prior to acceptance of the space. The entire process generally took 3-6 months from advertisement to occupancy for each DO. Regional leasing personnel maintained an official leasing folder for each DO; when the offices closed, these records were forwarded to the APSD for retention.

The New York RCC's average space for stateside DO's was 21,000 square feet, about twice the size of 1980. The extra space was needed because of additional personnel, computer, map, and equipment storage requirements for 1990. The average size for the nine Puerto Rico DO's was 9,272 square feet. (See table 4 for individual square footage.)

**Table 4. District Office Space**

| Number/name     | Square feet |
|-----------------|-------------|
| 2271 San Juan 1 | 8,190       |
| 2272 San Juan 2 | 7,946       |
| 2273 Bayamón    | 9,975       |
| 2274 Arecibo    | 9,382       |
| 2275 Aguadilla  | 8,600       |
| 2276 Mayagüez   | 9,619       |
| 2277 Ponce      | 9,975       |
| 2278 Caguas     | 9,975       |
| 2279 Carolina   | 9,788       |

**Communication**—The approximate telephone line requirement for the type 3 DO was 40 lines on a basic rotary (or comparable centrex) telephone system. The lessor certified that the required number of lines was available in each location. A supply of telephones (including headsets) was provided to ensure timely office opening and continuity of operations. The AO made arrangements for the lines to be installed on the day the office opened. Used telephone instruments were readily available from headquarters and utilized in DO's where the instruments were not provided.

Each DO manager was responsible for overall control of the telephone system and enforcement of the rules. The DO manager monitored the telephone logs, reviewed and certified the telephone bills, submitted them to the RCC for payment by way of the AO, and reported any violations of the telephone regulations to the area manager. Due to limited resources, there was no telephone assistance operation in Puerto Rico for 1990. If a person had a problem with the questionnaire beyond what the enumerator could answer, he or she would call the appropriate DO for further assistance. If the question still could not be answered, it would be dealt with from the AO.

Although the space for the 9 DO's had been leased for 12 months beginning October 1, 1989, staffing and computer equipment were not in place until the latter part of December due to budget constraints and a need to amend the equipment contract. In December 1987, the area office, in San Juan, had already opened for the 1987 agriculture and economic censuses operation, which was completed

before the 1990 activities began, and most of the furniture, equipment, and supplies needed for 1990 were already there. The office was officially turned over to the decennial census operation in July 1989. Some of the Puerto Rico staff had started working in this office in late 1988, translating forms and manuals needed for 1990.

**Kits**—The Data Preparation Division (DPD) in Jeffersonville, IN, assembled and shipped virtually all the material in units called “kits.” Kits were divided into two basic categories—office supply and training—for each census operation. In general, the DPD was able to assemble the Puerto Rico kits and stage them for two bulk shipments (the second and third bulk shipments of the original three planned were sent together), ahead of schedule, so they were on location when needed for training.

The procedures used to decide the quantity of kits for each operation in Puerto Rico were basically the same as those used for the stateside type 3 DO's. However, the quantities were tailored to the smaller Puerto Rico workloads based on the number of housing units for each DO (see DO configuration) and a FLD staffing and budget cost model for type 3 DO's (i.e., those using the L/E procedure for the census). Staff computed the workload and number of kits used in 1980 with the 1990 workload, decided how many kits would be needed for each census operation, and added a backup supply. They then calculated the total number of forms, manuals, training guides, and other materials needed for the kits.

The bulk shipment of kits to Puerto Rico was usually by land and sea. The kits and materials for each DO were loaded by the DPD into individual sea containers, which averaged about 26,000 lbs. each, bulk weight. Some materials required “second-day” air shipments; this was kept to a minimum and approved only for materials of critical need for training or processing.

Public-use forms used in Puerto Rico are listed in appendix 13C. The variety of forms tended to be smaller than those used stateside. While the substantive content of the stateside questionnaires was considered in designing forms for Puerto Rico, there were differences in the population and housing sections between the two sets of forms. For example, all questionnaires used in Puerto Rico would be processed by keyed data entry, requiring a format other than the one needed for FOSDIC (film optical scanning device for input to computers; see ch. 8).

**Supplies, furniture, and equipment/kit assembly and shipment**—The office supply kits contained supplies, some furniture (most of the furniture was acquired from GSA in Puerto Rico), and equipment that a DO would need to furnish the office or keep in stock. Kits were numbered by kind, with the first digit referring to DO type. Since all DO's in Puerto Rico were type 3 offices, all office supply kits began with “3,” for example, kit 301 PR, general office supplies. The second and third digits indicated the type of kit, for example, “04” administrative forms, and “07” manuals, followed by the alpha designation of PR for Puerto

Rico. The letters “A” or “B,” behind some kit numbers, indicated kits scheduled for initial or second shipments. (See appendix 13A for a list of the office supply kits and the total number sent to the DO's.)

**Crew leader and enumerator supply kits**—The supply kits for Puerto Rico crew leaders and enumerators contained the forms and supplies needed to complete most of their jobs. Some enumerator supply kits, containing an initial supply of questionnaires, were packaged in enumerator portfolios. Kit numbers for both crew leaders and enumerators corresponded to the training guide numbers for those positions, except that the first digit of “5” was used for all supply kits (see app. 13A). The following are examples of supply kit numbering:

549 PR L/E - enumerator supply

555 PR L/E - crew leader supply

**Training kits**—The trainee kits for Puerto Rico contained all the supply items, manuals, forms, training aids, etc. needed during training. The instructor kits contained most of the items in the trainee kits plus any additional items the instructor needed for training. All trainee and instructor kits began with the first digit of “6” (see app. 13B). Most trainee kits had the same numbering as the instructor's kits, but ended with the suffix “A.”

## Manual and Training Material Preparation

This operation for Puerto Rico began in January 1988, when the Puerto Rico Section (PRS) was established in the Procedures and Training Branch of the FLD. It was responsible for the adaptation, review, editing, and illustration of materials for Puerto Rico. The PRS translated the questionnaire and administrative forms; all other materials such as manuals, training guides, self-studies, workbooks, and related materials for crew leaders and enumerators were translated in Puerto Rico. Supervisory level materials as well as manuals and guides for office operations were in English only, since the Bureau recruited sufficient numbers of bilingual personnel islandwide for those office positions.

The PRS consisted of two newly recruited staffs located in two different geographical locations: one at Bureau headquarters and the other in San Juan. The headquarters staff was under the direction of a team leader, who was the overall coordinator for the operation. He was assisted by five bilingual staff members—two survey statisticians, a training specialist, and two Spanish translators. The San Juan staff, located in the AO, consisted of a team leader, an assistant team leader, and three Spanish translators recruited from a referral source recommended by the University of Puerto Rico. All three held master's degrees in Spanish translation. Completed initial draft translations were shipped on a flow basis to the PRS in Suitland, MD, where illustrations were incorporated into the text before the drafts were circulated to participating divisions for comments.

The project got underway in March 1988, when headquarters staff began to adapt and translate into Spanish almost 120 census forms used for data collection and

personnel administration (such as payrolling and appointing intermittent census workers). In September 1988, this staff started the adaptation of the stateside versions of the manuals and training materials. Typically, the latest version of materials used for the adaptation was the stateside "table review version," before the incorporation of final comments.

A total of 327 forms, manuals, and training guides were translated into Spanish for use by Puerto Rico field personnel (see table 5 below).

**Table 5. English-Language Materials Translated into Spanish for Use in Puerto Rico**

| Series No./form  | Form sponsor             | Item           | Quantity translated |
|------------------|--------------------------|----------------|---------------------|
| BC .....         | Bureau of the Census     | Form           | 8                   |
| CA .....         | Department of Labor      | Form           | 1                   |
| CD .....         | Commerce Department      | Form           | 1                   |
| D-1-499 .....    | Decennial Census         | Form           | 122                 |
| D-500-599 .....  | Decennial Census         | Manual         | 40                  |
| D-600-699 .....  | Decennial Census         | Training guide | 48                  |
| D-700-4011 ..... | Decennial Census         | Miscellaneous  | 62                  |
| SF .....         | Standard Government form | Form           | 9                   |
| All other .....  | All other                | Miscellaneous  | 1                   |

The PRS staff prepared a Form D-476 PR, Forms, Supplies, Equipment, and Materials Required for Census, for each form they translated. The D-476 PR was used to determine the total quantity of each Puerto Rico form needed for kits, office supply, and backup. The D-476's for most stateside operations were computerized, but the Puerto Rico staff did them manually because of the area's uniqueness (number of offices, workload, location, etc.)

The overall quality of the translation, and suitability to the local vernacular, appeared to be better than for that of the 1980 census. However, during the 1990 translation operation, there were a few, difficult to resolve, logistical problems that occasionally affected the timely production of the materials. One was the physical distance between the two staffs. It was not always possible to keep both staffs informed about the latest revisions in stateside procedures and incorporate these changes into the drafts already being translated in Puerto Rico. The other was the dependence of Puerto Rico's field procedures upon the development of stateside procedures. Materials for the various L/E operations were often the last to be produced in the stateside writing schedule. This meant that adaptation and translation into Spanish were occasionally delayed, and in some cases materials were finalized, printed, and shipped to San Juan only a few days before the Puerto Rico operation was to begin.

The manual and training material operation ended in July 1989, and the PRS of the Procedures and Training Branch closed operations. Four (headquarters) staff members, who remained, became the PRS of the Project Management Staff, which coordinated the overall field operations. The PRS translators in Puerto Rico applied and were selected for other positions in the DO's.

## Personnel

**Introduction**—All Puerto Rico management and supervisory personnel had to be bilingual. This was necessary for efficient communications between headquarters and Puerto Rico since important procedural and informational memorandums concerning various operations, and requiring immediate action, were issued from headquarters in English. Thus, the non-Spanish-speaking headquarters and regional staff overseeing the Puerto Rico offices could communicate directly with the appropriate individuals responsible for specific operations.

**Staffing**—Most temporary census workers were "intermittent" employees in the DO's. They were paid an hourly wage and worked for as long as their services were required. Intermittent employees did not receive benefits of any type, including leave or medical insurance. Hiring for all intermittent jobs was determined by selection-aid results, work experience, and a reference and background check. Intermittent positions, which included office and field jobs, are listed in table 6.

Enumerators, who collected virtually all census data from the public, were the most numerous employees. Team enumeration was used in Puerto Rico at the discretion of the DO manager, the same as stateside. A crew leader supervised a group of enumerators with contiguous assignments. Given the changes and enhancement to the crew leader position, and the fact that the crew leader was responsible for meeting with his or her enumerators on a daily basis, the ratio of enumerators to crew leaders in Puerto Rico was set at 8-to-1. The field operations supervisor oversaw the activities of several crew leaders. Field employees were to work in the area nearest their residence, while office employees performing clerical and administrative tasks typically lived within the DO's commuting area.

**Table 6. District Office Staffing by Personnel Type**

| District office | Personnel type |            |             |              |                          |                             |
|-----------------|----------------|------------|-------------|--------------|--------------------------|-----------------------------|
|                 | All types      | Enumerator | Crew leader | Office clerk | Supervisory office clerk | Field operations supervisor |
| Total .....     | 10,251         | 7,974      | 918         | 1,134        | 118                      | 107                         |
| San Juan 1 ..   | 861            | 670        | 77          | 95           | 10                       | 9                           |
| San Juan 2 ..   | 842            | 655        | 75          | 93           | 10                       | 9                           |
| Bayamn .....    | 1275           | 992        | 114         | 141          | 15                       | 13                          |
| Arecibo .....   | 1278           | 994        | 115         | 141          | 15                       | 13                          |
| Aguadilla ..... | 1036           | 805        | 93          | 115          | 12                       | 11                          |
| Mayagüez ...    | 1120           | 871        | 100         | 124          | 13                       | 12                          |
| Ponce .....     | 1310           | 1019       | 117         | 145          | 15                       | 14                          |
| Caguas .....    | 1262           | 982        | 113         | 140          | 14                       | 13                          |
| Carolina .....  | 1267           | 986        | 114         | 140          | 14                       | 13                          |

**Recruitment/selection**—The area office had a recruiting operation in place prior to the DO's opening and provided each DO with a file of applicants. The recruiting operations supervisor in each DO, as directed by the district office



manager, placed ads, public service announcements (PSA's), made contacts with civic organizations, and recruited by word of mouth. Also community awareness outreach specialists assisted in passing the word about jobs. There was no focus on hiring teachers as there had been in the past.

In the DO's, the assistant managers for administration selected the staff. After the recruiting clerks submitted the applications from prospective candidates (the testing ratio was—as stateside—four people to each available position), the electronic data processing section in the DO captured the information and submitted the candidates' names and social security numbers for an internal check against Federal Bureau of Investigation (FBI) files. (A temporary problem resulted from the lack of communication between headquarters and the Puerto Rico DO's on how to expedite clearance checks when time schedules had to be met. Just days before enumerator training was scheduled to begin, several thousand applications that had not received FBI clearance had to be manually sorted and assigned to crew leader districts and scheduled to the enumerator training sites.) A list of qualified applicants passing the FBI clearance was then passed back to the assistant manager for administration.

Office clerks interviewed each person by telephone and checked job references for candidates who were still interested in working for the census. Candidates who passed the reference check were recontacted by the office clerks, who made job offers and then assigned those accepting to classroom training for a specific census operation. Past experience had shown that census field work was done best by people who were familiar with, and accepted in, their own neighborhoods. Thus, the DO's attempted to geocode the candidates' residential addresses because the recruiting clerks did not always understand how to use the municipio (county) locator maps or the importance of properly geocoding the home addresses of the applicants.

Due to high unemployment in Puerto Rico, recruiting qualified applicants was not a problem. About 64,000 candidates applied for about 10,000 positions. Training sites were approximately as many as the number of crew leaders hired (918) plus the field operations supervisor districts (107), which also conducted training. (See table 6 for DO staffing.)

## Training

**Managers**—The 54 district office managers, assistant managers, and recruiting office supervisors were trained together over a 2-week period in December 1989. The method of training was a verbatim English training guide designed for the type 3 DO's, which had been adapted for Puerto Rico. There were 5 classroom days with some video presentations and working-group exercises on managerial problem-solving situations. The area managers received additional classroom or on-the-job training from the New York RCC administrative support supervisor; the EDP area manager also received training from the area office EDP technician.

Some of the DO managers were included in these sessions, depending upon their work schedules.

Due to the organizational structure of the training, some DO managers may have had difficulty asserting their roles as managers. Although taught with their subordinates, they were not given the detailed training of census activities and operations their assistants were. In some offices, this may have caused DO managers to be viewed as coworkers. The recruiting office supervisors received the same training package as the assistant managers (although they were not considered assistant managers). They were hired and trained after the office openings, which delayed DO recruitment. (Stateside recruiting office supervisors were hired and housed in the RCC's, and began recruiting for the DO's before the DO openings.)

**Field and office staffs**—Crew leaders were trained during the week of March 12, 1990. Hindsight revealed that crew leader training needed to be earlier in order to allow additional time to locate enumerator training space and possibly to identify oversized address register areas (ARA's). Also, this would have allowed the DO's some extra time to recruit replacement crew leaders for those persons who resigned after attending training.

After potential enumerators had completed a mandatory self-study course, they received 2 to 2-1/2 days of classroom instruction (which the crew leaders led, using verbatim guides to ensure consistency). This was followed by 1/2 day of listing practice and a final review test that the crew leaders graded. The crew leaders used the test scores, the first six listings matched against the advance listings, and class participation to determine if an enumerator was adequately trained, needed further on-the-job training (OJT), should be kept in reserve, or should be released. Most office staff received OJT from their supervisors.

With a high unemployment rate on the island, census workforce turnover was low, and employees tended to remain on the job. Since the Bureau anticipated the lower turnover, it was able to train fewer persons as replacements for individuals not completing their assignments.

## Questionnaires

Chapter 6 details the collection of census data, and both it and Chapter 8 ("Pretabulation Processing") discuss the handling of the questionnaires (see these chapters for further details). As in any other area of the United States and its territories, the decennial census was the single most important vehicle for collecting small-area data. Thus it was of critical importance that the content of the questionnaire be carefully established to ensure that data items needed for political decisionmaking, planning of facilities and services, and allocation of Federal funds were on the questionnaire.

It was the Bureau's policy to follow, as closely as possible, the stateside questionnaires (see ch. 14) so that there were comparable data for both areas. However, since Puerto Rico is not a State, and given the socioeconomic, cultural, and climatic differences between Puerto

Rico and the States, the Bureau tailored the Puerto Rico questionnaires to fulfill specific data needs of the Commonwealth. As stated before, one of the objectives of the agreement was the "recognition of the special needs of Puerto Rico." To determine these special needs, the Puerto Rico government collaborated extensively with the Bureau. The PRPB of the Office of the Governor organized and supported an interagency group to study the proposed stateside census questionnaires and recommend content for the 1990 Puerto Rico forms. The content differences between the Puerto Rico and stateside questionnaires were the result of meeting Puerto Rico's special data needs.

The process of determining census questions for 1990 began with an assessment of 1980 census data use. A local public meeting in March 1985, sponsored by local organizations, afforded a wide variety of users from private and public sectors alike, the opportunity to express critical judgments on the adequacy of the data and to suggest new or modified data elements for the upcoming census.

The 1990 Puerto Rico questionnaires were printed in both English and Spanish and were designed to be keyed documents. There were both short- and long-form questionnaires with formats similar to the stateside questionnaires. The short form contained the 100-percent questions asked of all persons and households, while the long form contained the same 100-percent questions, plus the additional ones asked in a sample of the households. The differences in content between the stateside and Puerto Rico versions of the 1990 census questionnaires fell into three classes: (1) questions asked only on the stateside questionnaire, (2) questions asked only on the Puerto Rico form, and (3) questions on both stateside and Puerto Rico forms for which there were some differences in response categories (see figure 1).

Substantial changes in wording of the instructions, questions, and/or response categories from 1980 to 1990 involved the items on citizenship, veteran status, place of work, class of worker, income in previous year by source, and second or junior mortgage. Items dropped altogether in 1990 were access to unit, weeks looking for work in previous year, electric lighting, and land rent. New questions added included total years of military service, disability-personal care limitation, and time of departure from home to work.

## Preparatory Work

**Geographic programs**—In preparation for each of the past three decennial censuses, the Census Bureau has worked with the PRPB to establish the geographic statistical areas for Puerto Rico. These cooperative efforts have improved the representation of the geographic areas for each census. For the 1990 census, the GEO started the geographic programs for the island earlier than for previous censuses. In addition, members of the PRPB participated

in the National Geographic Areas Conference in April 1984. Most of the geographic work was coordinated by the New York regional office. For the 1990 census, the Bureau and the PRPB were involved in a number of related programs described below.

**Block Boundary Definition Project (BBDP)**—To ensure the ability to tabulate data for the election districts in Puerto Rico, the Census Bureau asked the Commonwealth government to identify features that either reflected or approximated the district boundaries; these features were then held as the boundaries for 1990 census blocks. The PRPB enlisted participation from 20 municipios for the BBDP. This was the first phase of a three-phase project. During phase 2, the PRPB annotated district codes and highlighted the block boundaries that, as closely as possible, represented the election districts. As a result of the BBDP program, Puerto Rico received data tabulations for 1,606 election districts as part of phase 3.

**The Census Tract Program**—In Puerto Rico census tracts are small, relatively permanent geographic divisions of municipios that generally have between 2,500 and 8,000 inhabitants. (This criterion is the same in Puerto Rico as on the Mainland.) Census tracts are designed to be socioeconomically homogeneous areas bounded by physical features. For the 1990 census, Puerto Rico established a Census Statistical Areas Committee (CSAC), which represented a broad spectrum of interested data users. The CSAC reviewed the existing 463 census tracts for 1980 and established new tracts in 34 municipios for 1990. The existing census tracts with very low populations were combined; those with high populations were divided. The census tract plans were submitted to the Census Bureau in the spring of 1986.

**Block Numbering Areas (BNA's) Project**—For those 24 municipios in 1990 that did not participate in the census tract program, the PRPB worked with Bureau staff in 1985 to establish BNA's, which are treated as an equivalent to census tracts. Thus, every municipio in Puerto Rico was subdivided into either census tracts or BNA's. Together, these units provided an islandwide framework for block numbering.

**Block Group Definition**—Block groups (BG's) are divisions of census tracts and block numbering areas and serve as a guide for block numbering. Although not symbolized on census map products, the boundaries of a BG are derived by looking at the block numbers; all blocks within a census tract or block numbering area with a first digit of "1" (e.g., 101, 102, 107, 108, 109, and 110 together) comprised BG1. The Planning Board and the CSAC delineated for the first time for 1990, BG's for their census tracts and BNA's. BG's provide data users with very small, locally delineated tabulation areas. BG's are the smallest geographic areas (containing approximately 400 housing units) for which sample data are presented.



Figure 1. Comparison of 1990 Puerto Rico and Stateside Questionnaires

| Population   | Housing                                     |
|--|---|
| Stateside items not on Puerto Rico:                  |   |
| <i>100-percent</i>                                   |   |
| Race   | Congregate housing (meals included in rent) |
| Hispanic origin                                      |   |
| <i>Sample</i>  |   |
| Ancestry   | Heating fuel                                |
| Language spoken at home                              |   |
| Puerto Rico items not on stateside:                  |   |
| <i>100-percent</i>                                   |   |
|  | *Plumbing facilities                        |
|  | *Condominium status                         |
| <i>Sample</i>  |   |
| Birthplace of parents                                | Type of construction                        |
| U.S. residency and activity during the last 10 years | No. of bathrooms                            |
| Ability to read and write                            | Cooking fuel                                |
| Ability to speak Spanish and English                 | Air conditioning                            |
| Vocational training                                  | Condition of housing unit                   |
|  | Type of water heater                        |
| Common to both, but with minor differences:          |   |
| <i>100-percent</i>                                   |   |
| Marital status                                       | Value of home or monthly rent paid          |
| <i>Sample</i>  |   |
| Year of immigration                                  | Farm residence                              |
| Residence 5 years ago                                |   |
| Place of work and commuting to work                  |   |
| Place of birth                                       |   |

\*100-percent for Puerto Rico, but sample stateside.

*Census Designated Place (CDP) Program*—In November 1988, the CSAC and the Bureau reviewed and updated the 1980 census boundaries for the comunidades (referred to as aldeas in prior censuses) and zonas urbanas, and suggested boundaries for additional potential comunidades for 1990.

*Review of Legally Defined Areas*—The Bureau also worked with the PRPB to verify the names and boundaries of each legally defined geographic entity for which the decennial census would publish data: municipio and municipio subdivision (barrio, barrio-pueblo, subbarrio). The barrios-pueblo were called pueblos in prior censuses.<sup>5</sup>

The Bureau implemented this review in June 1985 by sending the current list of the names of municipios, barrios, subbarrios, pueblos, and ciudades to the PRPB for certification of spelling accuracy and completeness. After this

initial review, the GB/DPD (Jeffersonville, IN) shipped maps to the New York RCC geographic staff who reviewed them to make sure there were no major errors and that the map coverage was complete before sending them to the PRPB. Any maps with boundary corrections returned to the RCC were forwarded to the GB/DPD.

One of the primary goals of this project, in addition to obtaining correct names and boundaries and providing maps for certification by Puerto Rico officials, was to integrate the Puerto Rico mapping activities into the mainstream TIGER data base planning and production processes. The NY RCC oversaw this review process. The GEO completed the review by June 1989 and inserted any changes into the TIGER file so that the corrected boundaries would appear on the precensus maps.

*Urban/Rural Issue*—To improve its measure of the urban and rural population, the Bureau in 1950 adopted the urbanized area (UA) concept. The major objective was to provide a better separation of urban and rural populations

<sup>5</sup>See Appendix 13D ("Geographic Concepts") for further clarification of political/legal/administrative entities and statistical entities.

in the vicinity of large cities or, in the case of Puerto Rico, large zonas urbanas.<sup>6</sup> Prior to the 1990 census, many meetings were held between the PRPB and the Bureau to discuss the appropriateness of using the same urban/rural criteria in Puerto Rico as in the United States. As a result of these discussions, officials in Puerto Rico decided to use the same urban/rural criteria. The most significant component of these criteria is the UA, which comprises a central place and adjacent densely settled surrounding that together have a population of at least 50,000 and generally have an overall population density of at least 1,000 persons per square mile.

Many demographic, geographic, and statistical studies require the classification of population and/or the land area as either urban or rural. The Bureau defined the urban population as those persons living in UA's and non-UA places (zonas urbanas or comunidades) of 2,500 or more inhabitants. A population that is not defined as urban is classified as rural. Therefore, it is possible to have a "rural" zona urbana. Seven zonas urbanas had a population of less than 2,500 and therefore were rural. Based on the 1990 census, two new UA's were added (Cayey and Humacao) and the existing seven from 1980 (Aguadilla, Arecibo, Ponce, Mayagüez, Vega Baja, San Juan, and Caguas) gained additional population and area. Results from the 1990 census showed that 60.3 percent of Puerto Rico's population, or 2.1 million people, lived in UA's.

**Map preparation**—The map base for the 1990 census was derived from U.S. Geological Survey (USGS) quadrangle ("quad") maps. The "quads" for Puerto Rico, however, had to be manually digitized. Then a digital file was created, and "feature change maps" were produced for updating. Extensive updates were made to these maps by PRPB staff working with Census Bureau 1980 Metropolitan Map Series (MMS) maps and other sources. The NY RCC concurrently updated the feature change maps and assigned key numbers to features. The digitizing process defined all new and changed features and inserted the feature names in the electronic file. Census Bureau regional office geographic staff used aerial photography and local source maps to further enhance the quality of the map base.

Unlike metropolitan areas in the United States, where the Geographic Base File/Dual Independent Map Encoding (GBF/DIME) files were used to construct the TIGER data base, the Census Bureau did not use the GBF/DIME file in Puerto Rico. Thus, the feature network in the TIGER data base may have a more geometrically accurate map base, but it contained less attribute information, e.g., address ranges. All field collection maps used in Puerto Rico were similar to stateside equivalents, e.g. enumerator maps and crew leader maps. There was uniform Spanish terminology for map features and a unique Spanish legend for maps.

<sup>6</sup>A zona urbana was the community around the historic governmental seat of each municipio. See app. 13D.

## List/Enumerate Operation

The 1980 census of Puerto Rico used what then was called the "conventional" procedure—house-to-house canvassing. In areas with postal delivery, the Bureau mailed advance census reports (ACR's), form D-13 PR, to each household. ACR's were short-form household questionnaires that asked the householder to complete the form and hold it for an enumerator to pick up. The enumerator systematically canvassed his or her assigned area, listed each housing unit, collected the D-13PR from the household, followed up on any missing information on the D-13 PR and, where instructed, collected additional information for sample-designated households.

A joint FLD and DPLD conference in December 1986 reviewed the 1980 enumeration and considered procedures for 1990. The participants discussed the feasibility of a mailout/mailback operation in selected areas of Puerto Rico for 1990. Later, the GEO evaluated address lists received from several sources in Puerto Rico, then decided that it could not geocode<sup>7</sup> these addresses by automation. Address conventions in Puerto Rico were so diverse from stateside patterns that they could not be standardized without making extensive modifications to the standardized stateside programs and "look-up" tables already in place. Also, the house number and street names were not always unique within post office/ZIP Code combinations. Clerical geocoding would have been very expensive, and the necessary reference materials were unavailable. The GEO concluded that a straight listing operation would be a more effective approach for creating an address list and recommended that a committee/task force further evaluate automated geocoding-mailout/mailback after the census. Also, the GEO decided not to use the GBF/DIME files to create the TIGER data base for Puerto Rico.

Based on the results of the earlier conference and subsequent meetings, a recommendation was made to conduct the 1990 census in Puerto Rico "conventionally," as it had been in 1980. This type of enumeration was now called L/E. The L/E operation was scheduled to begin after enumeration training during the week of March 26, 1990, and end on April 26. The L/E was a method of collecting housing and population data. Using a census map, an enumerator would travel through his or her assigned geographic area, an ARA,<sup>8</sup> map spot the location of each housing unit on a census map, list the address and/or location description for each housing unit in an address register and, if necessary, pick up a completed form or enumerate the housing unit and its inhabitants on blank copies of the Spanish versions of short- and long-form questionnaires.

<sup>7</sup>Codes to identify the location of a living quarters. Geocodes for 1990 included the DO code, the ARA number, the block number, and the map spot number.

<sup>8</sup>An ARA was a small geographic area, usually a block group or part of a block group, the basic unit of data collection for a single enumerator during the 1990 census. The ARA was equivalent to a 1980 enumeration district.

During the week before March 23, 1990, the Postal Service delivered ACR's to all residences that received mail on the postal routes. However, there were some remote areas where postal carriers did not deliver the ACR. Enumerators canvassed those areas and completed the questionnaire with the household as they encountered the living quarters in their canvassing. The Bureau referred to these non-ACF versions of the questionnaire as enumerator-friendly questionnaires (EFQ's) because they contained questionnaire wording suitable for personal-visit interviews.

In 1987, local and commonwealth officials and private organizations provided Bureau staff with lists of special places (places where people either lived or stayed other than the usual house, apartment, or mobile home such as colleges and universities, boarding houses, hotels, nursing homes, and prisons). These lists were compiled into a unified inventory at Bureau headquarters, geocoded, and sent to the DO's for update and correction. In January 1990, special place enumerators used telephone books and other local sources of address information to update the special place listing ("local knowledge update"). DO's then sent enumerators into the field to verify the existence and location of each special place (as part of the special place prelist operation). During this operation they listed, geocoded, and map spotted each group quarters and housing unit at the special place, obtained an estimate of the number of people, the person to contact, and other related information about the living quarters at the special place.

On March 29, 1990, enumerators went to their ARA's with address registers or address listing books (ALB's) containing three colored sets of address listing pages. Enumerators canvassed their ARA's on a block-by-block basis and recorded address information (including complete mailing address, occupant's name, geographic information, and physical location) for all housing units encountered in their ARA's on the white pages (form D-104A PR). The yellow pages (form D-104B PR) showed the addresses of all known special places in a given ARA; enumerators added to, deleted from, or corrected these. Addresses of any special places added during the enumeration were turned over to special place enumerators for data collection. The tan pages (form D-104C PR) contained the addresses of all known housing units located in or associated with special places in the enumerator's ARA (e.g., a janitor's living quarters at a hospital, a college president's residence, or a housemother's apartment in a dormitory). The L/E enumerator completed a questionnaire for these HU's and their inhabitants and added the address(es) to the white pages of the address register.

If a respondent had not received or had not completed an ACR, the enumerator conducted an interview using the appropriate EFQ (indicated in column 10, form type "FT," of the listing page). If the housing unit was designated for a long-form questionnaire (an "L" in column 10) and the respondent had filled an ACR, the enumerator checked the ACR for completeness and asked the respondent the sample questions from the long-form EFQ. He or she later

transcribed the data from the ACR to the long-form EFQ. The enumerator also completed a questionnaire for an unoccupied housing unit to obtain information for the census of housing. Enumerators turned in their work daily and filled out Form D-308 PR, Daily Pay and Work Record.

One significant enumeration problem involved the manner of asking and recording a residential address in the address register. Enumerators were trained to obtain first the mailing address by asking the question, "What is the exact mailing address of this living quarters?" at each place they visited. In Puerto Rico, households frequently used post office boxes to receive their mail. Therefore, even though the housing unit also had a city-type address (house number and street name), and even though they were instructed to obtain additional information (name of occupant and physical location of the living quarters), when they recorded a post office box number in the listing book, there was a tendency not to add that information. Problems arose in later census operations when a followup enumerator had to locate that unit, which was only identified by a post office box number and not the other required information.

**The ARA**—In Puerto Rico, ARA's were subdivisions of block groups designed to facilitate field activities. Similar to the 1980 ED's, they contained approximately 140-160 housing units. The number of ARA's in Puerto Rico for 1990 was approximately 5,700. The size of the ARA was based on an estimate, since the number of housing units in the ARA would not be known until the actual enumeration took place. At the time of enumeration, the field operations supervisor reviewed the ARA's and recommended oversized ARA's be administratively split into two or more pieces for more efficient enumeration. The DO staff did the actual splitting (according to instructions in the D-530 manual) under the supervision of the assistant manager for field operations<sup>9</sup>. This involved determining where to divide the ARA along existing block boundaries so that the area could be enumerated within the time allotted, and making enough copies of the map sheets so that each enumerator assigned to a portion of the ARA had a complete set of map sheets. On each set, clerks color-shaded new ARA boundaries in along existing block boundaries and assigned a letter ("alpha") suffix to each of the new ARA's (for example, ARA 6001B, ARA 6001C, etc.).

In some urbanized areas, however, an ARA could not be split into component blocks because the ARA consisted of only one block. For example, the Isla Verde area in Puerto Rico typically had condominium apartments along the ocean front. The ARA boundaries were not delineated by several blocks, but rather by a single road or street leading into the condominium complex of several buildings. The ARA may have contained 10 buildings with 350 apartments in each building. The assistant manager for field operations split the ARA into buildings, giving one to each enumerator.

<sup>9</sup>See Field Operations Manual, D-530 PR, chapter 3, paragraph 3D.

Rather than having the first enumerator start with map spot 1, the second with 1001, the third with 2001, etc., as directed, each enumerator began numbering his or her part of the split ARA with map spot "1." As a result, each of the 10 enumerators was listing housing units with the same map spots within the same block. Electronic data processing (EDP) accepted the first questionnaire turned in as the one with a valid map spot number. The other nine enumerators' questionnaires with duplicate map spot numbers were rejected as "duplicate" questionnaires. Once this problem was identified, enumerators were instructed to use a unique map spot number range to unduplicate the questionnaires.

### **Advance Listing**

The first field work conducted for the L/E operation was the advance listing of selected addresses. Advance listing, between February 26 and March 12, was a quality assurance (QA) operation that measured the accuracy of the L/E enumerator's address listings. After completing a self-study, all potential advance listers received 3 1/2 to 4 days of training, during which they practiced listing. The field operations supervisors reviewed the results to ensure that the advance listers obtained adequate address information; if not, the advance lister had to obtain more complete information. The listers who successfully finished advance listing became crew leaders or enumerators. If they accepted these positions, they did not work in the same ARA's that they advance listed (each enumerator was supposed to be assigned an ARA close to or in the neighborhood in which he or she lived). The FLD prepared an abbreviated crew leader training package for experienced advance listers; as part of their advance listing training, they had received the crew leaders' enumerator training.

The field operations supervisor designated two blocks to be advance listed in each odd-numbered ARA, for example, ARA's 6001, 6003, 6005, etc. Clerks then indicated the point at which to begin canvassing in each of the two blocks by entering red X's at the spot on the corresponding ARA map. Advance listers began canvassing from the starting point for the first preselected block, listed the mailing addresses, and related information for the first six living quarters on Form D-169 (L/E) PR, Quality Assurance Listing and Matching Record; map-spotted the locations of the six living quarters on a census map; and repeated the process for the second preselected block in the ARA.

The field operations supervisor reviewed the advance lister's work to ensure that it was complete and done according to procedure. The supervisor would travel to a randomly assigned area and do a quality assurance check. Using the advance listing, crew leaders subsequently checked the quality of the enumerator's work for the ARA by matching advance listings against the enumerator's listings and verifying the accuracy and completeness of the address lists. If the number of listing errors was out of tolerance, the crew leader would reassign the area to a new enumerator.

### **Assignment Control**

The assignment control operation's primary function was to check in, review, and distribute the enumerators' work within the DO. Questionnaires not having all the required information were returned to the crew leaders for the enumerators to obtain missing or incomplete information. Assignment control was performed for all field activities in which enumerators interviewed respondents.

The assignment control unit compiled a computerized list of all cases assigned to the field followup operation. The list, Form D-384 PR, Record of Followup, contained cases identified as "missing," cases that required resampling, and cases assigned for vacant/delete followup. The assignment control clerks checked and verified that all the required information on the questionnaire was present. Then they transmitted the materials to the appropriate work area within the DO. The assignment control unit sent completed questionnaires to the ADP unit in the DO for data entry/check-in. Assignment control was supervised by the assistant manager for office operations. Due to the speed of the field operations, in most cases, the assistant managers for office operations found themselves not knowing how much work was accepted/rejected in time to take corrective measures.

There were some backlog problems with generating the D-344 PR, Prelist ARA Directory, on the L/E operation. The D-344 PR report was supposed to be created daily from information keyed from the D-308 PR, Daily Pay and Work Record, and from the information on the questionnaires (occupancy or vacancy status, number of persons in the household). The D-344 PR report was to be used by the crew leaders as a supervisory tool to monitor enumerator cost and production. The EDP sections in the DO's were so occupied with keying personnel and payroll information during the peak period for the L/E operation that they could not cope with the D-344's PR in a timely manner.

### **Merge/Sample Tolerance Check**

The primary purpose of the merge operation was to assure that there was a completed questionnaire in the collection control file (CCF) for each listing in the address listing book. The merge operation was the same one used for the stateside DO's with one exception; the Puerto Rico DO's retained the questionnaires until all operations were completed; whereas, the stateside DO's had already shipped their questionnaires to the processing offices.

After the questionnaire checkout operation was completed, the EDP section produced a merge listing. This was a computer listing of all the questionnaires that had been given an ID number and checked out (which meant that the questionnaire had been physically located). The questionnaires were then numerically sorted and filed in the DO library for one final operation, the translation into English of the industry and occupation entries before shipment to the Bureau's Jacksonville, FL, processing office. During merge, clerks matched the geocodes from the merge listing to

those in the address listing books. Any geocode not found on either the merge listing or the address listing book was added to the source from which it was missing.

In the Isla Verde area, some problems were encountered during the merge operation resulting from having duplicate serial numbers. That is, EDP had checked two forms for the same housing unit with two different geocodes for that unit. Several sources caused this problem. One was the duplicates resulting from the administrative ARA splits (mentioned above); another was the result of some enumerator not following procedures for identifying ACR's (see the Crew Leader Manual, D-555, chapter 3, or D-555 PR, chapter 3) that had been replaced by long-form questionnaires. The EDP section received both a short form (ACR) and a long-form questionnaire for the same housing unit. Not realizing this was the same housing unit and because the two questionnaires were not necessarily received in the DO at the same time, it assigned two different ID's. In order to correct this problem, the DO's were instructed to match the questionnaires to the address listing books and unduplicate questionnaires.

After merge, an automated sample tolerance check was designed to ensure that the population enumerated on long forms was statistically the same as the expected population on those forms: The sample tolerance check compared the distribution of household size (including vacants) for short- and long-form questionnaires and failed an ARA if the distribution was skewed at the low end for long forms. Failed ARA's had selected housing units that had received short forms. These housing units were revisited by an enumerator to obtain long form information. As a result of this resampling process, the DO's received additional long-form questionnaires to replace the short forms. In some ARA's that had been improperly split and had duplicate map spot numbers within the ARA, the sample-tolerance questionnaire did not necessarily agree with the address listing book. In Puerto Rico, it was necessary first to clerically match the questionnaires with the address lists, correct the map spot numbers, and key corrections into the CCF.

### **Clerical Edit**

All DO's in Puerto Rico performed an office edit on all questionnaires, which consisted of a clerical edit that included reviewing each questionnaire, item by item, while looking for missing information and inconsistent entries. Edit clerks used logic tables, one for the short form and another for the long form, describing certain conditions and appropriate actions to be taken. Part of the edit operation was designed to improve within-household coverage and housing unit coverage for the 1990 census of Puerto Rico through a clerical inspection of item D, (household size), questions 1a (household roster), 1b (whole household usual home elsewhere), H1a (possible additions to roster), and H1b (possible deletions from roster) to identify incomplete or inconsistent information on the questionnaires. Procedures for the clerical coverage edits for Puerto Rico

were similar to those used for stateside, type 2 DO mail returns. The total workload for this operation was 1.2 million housing units (HU's). The primary divisions involved with designing and implementing the coverage edits were the FLD, the Statistical Support Division (which specified the processing needs for the evaluation of the coverage questions) and the DPLD (responsible for coordinating the documentation of requirements for evaluation of the coverage edit operation).

The general office edit was performed on all items on each enumerator's questionnaires. These returns had an address box that the enumerator filled at the time of his or her visit with the housing unit address, DO code, questionnaire ID number (filled by the office), and the geographic information (ARA, block, and map spot numbers). In addition, coverage edits performed included a review of questionnaires for potential missed persons. There also was a clerical content edit which failed questionnaires for missed and/or multiple answers and was designed to improve data quality and reduce item nonresponse.

The processing flow for the Puerto Rico DO's was similar to the stateside process. After the ADP staff checked in the questionnaires, created the ID numbers, and transcribed the ID's onto the questionnaires from the batch diary, the clerical staff in the ADP area applied black tape to the last data-filled page of each long-form questionnaire (in the upper right corner) using the specifications provided by the Project Management Staff, FLD. The data transcribers then checked the L/E questionnaires out of the CCF by keying in the box number and the ARA number, block number, map spot number, ID number, and population count from the L/E questionnaire. The FLD programmed the checkout module to be interactive so that if the ID and geographic codes keyed did not match those in the CCF, the data transcribers removed the problem questionnaires before boxing and sending them to the transcription unit for repair. Once repaired, the questionnaires were returned to the ADP unit for check-out. After check-out, the completed questionnaires went to the DO library. The DO's held all questionnaires almost until the end of the completion of all field operations (August 1990) and then sent them to JXPO for processing all at one time. (Unlike stateside's flow-processing to the PO's, questionnaires remained in the DO's until they were almost closed.)

### **Field, Content, and Coverage Edits**

Puerto Rico crew leaders conducted two formal reviews—first and final—of each enumerator to measure the quality of his or her work. During the first review, within 2 or 3 days after the enumerators began working, the crew leader edited the questionnaires for content and verified that the enumerator had filled in the check boxes for item 3, sex, and 4a and 4b, age and year of birth. The crew leader also conducted the coverage edit—reviewing question 1a, comparing the value entered in item D of the "For Census Use" box with the number of data-defined persons, checking for "whole household usual home elsewhere" (WHUHE's) and



additions or deletions to the household roster, checking for ACR's with exactly seven persons,<sup>10</sup> and reminding enumerators to fill continuation forms if necessary. Item D was the greater of the number of persons in the roster (question 1A) and the number of person columns with a name and at least one response. Data-defined person columns contained at least two responses besides name for each column.

If the value of item D and the number of data-defined persons were different, the questionnaire failed the coverage edit. Next, the crew leader checked item 1b (WHUHE) for a marked box or address(es) other than the one on the cover of the questionnaire. If either of these conditions existed, the questionnaire failed edit. The crew leader also checked questions H1A and H1b for a write-in or a mark in the "YES" box. If either condition existed for either question, the questionnaire failed edit. Crew leaders discussed errors/omissions with the enumerators and corrected them during the edit. For the final review when the enumerator completed an ARA, the crew leader used the check list inside the address register. Questionnaires that did not pass the crew leaders review were supposed to be given back to the enumerator, who would follow up and resolve any errors, if possible, and then return them to the DO's. Individual Census Reports (ICR's), Military Census Reports (MCR's), and Shipboard Census Reports (SCR's) did not go through these, but vacant, usual home elsewhere (UHE) and blank questionnaires did.

The office edit was one of the more successful operations in the DO's. Since there was no computer support system to control the flow of failed-edit questionnaires in the stateside L/E operations, a manual system was designed for Puerto Rico. (There was no office clerical edit in stateside L/E areas.)

## Telephone Followup

The purpose of this operation was to contact respondents by telephone from the DO's and resolve problems on the questionnaires that failed edit. This operation was to begin approximately when the office edit was completed and before the merge operation started. All failed edit questionnaires were returned to the Office Control in the DO. All forms marked "T" were passed on to the next office operation, "Telephone Followup" (TF). The telephone followup clerks conducted a roster check where they verified that all household members were listed in the person columns, regardless of the edit failure reason.

The telephone clerks looked up telephone numbers in directories or located the respondent's telephone number on the questionnaire. Then the clerks called and tried to obtain answers to those questions that failed edit. If the household was contacted, whether the edit failure was resolved or not, the questionnaire would be considered

complete. If there was no contact during the telephone followup operation after five calls, the questionnaire was sent for personal visit during field followup. In general, this operation followed the same procedures as stateside, with one exception: the DO's in Puerto Rico retained the questionnaires for subsequent operations.

Telephone followup accomplished its purpose, and the problems encountered were minor. The physical space for the telephone callers was less than ideal in the DO's, usually because it lacked adequate sound proofing. Some experience indicated that telephone followup should have begun earlier, possibly synchronized with the flow of work as it was generated from the office edit. Some of the cases scheduled for telephone followup were not completed because, to avoid delaying later census operations, the merge operation took priority.

## Field Followup (FFU)

This operation was conducted after the initial L/E and telephone followup activities had been completed. The purpose of field followup, which began on June 6, 1990, and ended 27 days later, was to improve data quality and census coverage by following up on blank and missing questionnaires or those with inconsistent or missing data items, by verifying the status of the units reported as vacant or deleted, and by obtaining additional long-form questionnaires in ARA's whose sample data quotas did not meet the sample tolerance check (resample cases). The total workload for Puerto Rico was approximately 194,000 HU's and involved about 1,500 enumerators and crew leaders. The DO retained some of the L/E staff to perform field followup. Those enumerators who worked during L/E in an ARA did not perform field followup in the same ARA. Combining the various types of cases into one field followup operation maximized the efficiency in time and travel cost.

For those failed-edit cases that required personal visit followup, the enumerator made up to two personal visits at different times of the day before obtaining "last resort" information. Last resort information included population items such as relationship, sex, and marital status; housing items for occupied units (description of unit, tenure, type of unit) or vacant units (description of unit, vacancy status, boarded-up unit status; nonexistent units; duplicate units; apartment mix-ups; or involved adding a new HU.

Field followup was successfully completed in the DO's. Housing units and persons were added to the census based on the Puerto Rico Multiunit Coverage Improvement Operation. (See the Puerto Rico Multiunit Coverage Improvement Operation for further details on field followup.)

## Special Place Operations

Special places were places where people lived other than separate living quarters typically a house, apartment, or condominium. For the census, living quarters associated with special places were divided into two types: HU's—such

<sup>10</sup>The questionnaire had space for entering data for seven persons; if there were more, the enumerator was supposed to fill out a "continuation" form.

as houses, apartments, or condominiums—and group quarters (GQ's). GQ's were living quarters in places such as college and university dormitories, boarding and rooming houses, homeless shelters, hospitals and nursing homes, prisons, and military installations; however, within such complexes there could be several GQ's and/or separate housing units in which staff might live.

Census Bureau headquarters identified special places in advance of Census Day (April 1, 1990) and provided the DO's with a computer printout (form D-329 PR) listing all special places. Each DO updated its list before taking the census by using local knowledge of the DO staff, conducting telephone directory searches, contacting college housing offices to determine if there were any off-campus dorms or other GQ housing, and conducting a special place prelist to identify all GQ's and HU's for each special place. Also, the special place operation supervisor contacted each military base and Coast Guard station in each DO area.

Special place operations also included Shelter/Street Night Operation (S-Night). This operation consisted of the enumeration of persons staying at shelters for the homeless, at hotels or motels costing \$12.00 or less per night, or in areas the local governments identified as places where homeless people might be staying. Officials from each municipio within the DO area provided additional information about the latter. To identify S-Night places, the New York RCC sent a letter, form D-33 (L) PR, to local officials in Puerto Rico requesting this information and compiled the results for the area office, which assigned the names and addresses of designated S-Night places to each DO.

**Group quarters (GQ) Enumeration**—GQ enumeration ran from April 2 through April 13. An enumerator visited each GQ and requested a list of the names of the people staying there. Then the enumerator prepared an Individual Census Report (ICR) packet for each person listed, left it for the person to complete, and at a specified date and time, returned to pick up the completed ICR's.

**Shelter/Street Night enumeration**—S-Night enumeration was on the evening of March 20 and during the early morning hours of March 21. A team of enumerators visited shelters and previously identified street locations, enumerating all visible persons (except those in uniform or persons engaged in money making activities) using the standard ICR.

**Transient Night (T-Night) enumeration**—The T-Night operation, on March 31, counted persons staying at YMCA's, YWCA's, commercial and public campgrounds, youth hostels, campgrounds at racetracks, fairs and carnivals, and the like, charging less than \$12 a night. The enumerators personally interviewed the guests/residents between 4:00 and 10:00 p.m.

**Military enumeration**—This consisted of both land-based and vessel enumeration. The Bureau used the unit control method to enumerate the land-based military to ensure that the census counted all personnel assigned to operating

units on the base. As stateside, regular census procedures covered the family housing on base. Each operating unit on base enumerated its own personnel. The local DO provided the base with the required materials for enumeration and conducted a training session for the military personnel who worked on the census. The military personnel were enumerated using Form D-21 PR, MCR's. Military personnel reported a UHE on the MCR if they resided in family-type housing on or off base. The local DO collected the enumeration materials and checked them in. After the DO's closed, the MCR's were sent to JXPO along with the other forms from GQ enumeration.

Military (Navy and Coast Guard) vessels also were self-enumerating. Based on addresses provided by the Navy and Coast Guard, the Bureau mailed Forms D-23 PR, SCR's, and other enumeration materials to each military vessel. The designated official on each vessel did the enumeration and mailed the forms to the Baltimore processing center (BAPO). As military ships were enumerated at their home port, personnel quartered on ships with Puerto Rico home ports were enumerated on Puerto Rico SCR's.

**Merchant vessels**—Crews of merchant vessels were enumerated using the stateside SCR's. Based on addresses provided by the Maritime Administration (MARAD) and other contacts, the DPD mailed SCR's and other materials to American flag maritime operators who forwarded the materials to the ship captain/masters. Officer, crew members, and passengers on maritime ships filled out their own SCR's. Officers, crew members, and passengers could claim a UHE. The ship's captain also completed a Form D-47 PR, Location Report for the vessel. The captain returned all the completed census materials to the Baltimore processing office. The forms were forwarded to the DPLD, which transcribed them onto the Puerto Rico Shipboard Census Reports, Form D-23 PR, and shipped these forms to the JXPO for processing.

### **Translation of Industry and Occupation (I & O) Information**

Responses to questions on industry and occupation (which appeared only on the sample questionnaire) were write-in entries, usually in Spanish. The Spanish I & O responses were translated into English in each of the nine Puerto Rico DO's following on the job training from the San Juan area office. The clerks were to use their local knowledge in translating the written responses to items 29(a), 29(b), 30(a), and 30(b). If the lists of English terms commonly used in Spanish for industries and occupations did not suffice, as well as dictionaries and other source materials, the clerks referred the case to their supervisor for resolution.

Some of the problems encountered during this translation operation were (1) answers provided by the respondent did not relate to the question asked, (2) some answers were difficult to understand because the respondent used company or professional jargon unknown to the clerks, and



(3) various respondents did not understand question 30(b) "What kind of work was....doing?" Even though the Bureau provided an example of how to answer the question and trained the enumerators to help the respondents, the replies were frequently inconsistent. In some cases, the translation was too literal and caused an incorrect interpretation. For example, the assistant managers for operations claimed that the English terminology of the D-532(H) PR, Translator's Instruction for Translating 1990 Census of Puerto Rico Industry and Occupation Entries, was not accurate. The appendixes of the manual were translated from Spanish to English literally, such as, (1) "Departamento de Servicios Sociales" (Spanish), Department of Social Services (correct English translation), Welfare Department (translation in D-532(H) PR; and (2) "Ejército de Salvacin" (Spanish), Salvation Army (correct English translation), Salvatory Army (translation in D-532(H) PR).

At the same time (September 24 through December 27, 1990) the I & O write-in responses on the D-2A PR (S) long-form questionnaire and the D-20B PR (S) long form, ICR, were being translated from Spanish into English, a QA operation (for the English translation) was being performed in the DO's. A sample of questionnaires with I & O entries that had been translated into English were selected and the translation verified by another translation clerk (verifier). Clerks were not to verify their own work. Questionnaires were sorted into work units (WU's) of 30 to 100 questionnaires and had a D-375 PR, "Envío de Trabajo" (work transmittal) accompanying each work unit. After the translation clerk completed a WU, he or she returned it to the supervisor. The supervisor gave the work unit to the assignment control clerk, who used the D-398 PR to control the flow of work units that had been translated and then assigned to verifiers. The verifier requested a work unit of translated questionnaires from the assignment control clerk.

The assistant manager for office operations reviewed the D-421 PR, Quality Assurance Record for the I & O Translation, on a daily basis and counseled any translation clerk with industry and/or occupation question error rates that were greater than 10 percent for a particular WU. During the first week of the translation operation, the assistant manager for office operations met with all the translation clerks each day and discussed particular problems or concerns.

### Computer Operations

The nine DO's in Puerto Rico had the same computer system that was installed in the stateside type 3 DO's. The AO, however, did not have all the computer capabilities of an RCC, and was not able to access the DO-level computer programs, reports, etc., to resolve DO problems online. The software programs were designed for the stateside questionnaires and payroll forms and the menus and screens that the keyers in Puerto Rico used were in English. Since the census in Puerto Rico used different questionnaires, primarily in Spanish, the EDP keying instructions were modified so that the keyers would be able to

determine where the comparable information on the Spanish questionnaires was located. However, problems were easier to resolve than stateside because Puerto Rico managers could physically meet to try to take care of any unforeseen situation. As a whole, operations went well.

**Automation in Puerto Rico district offices**—The stateside automation system, called the collection control system (CCS), was used without any adaptation in the nine DO's in Puerto Rico. The CCS was a relational data base system in the DO computer to support data-collection operations. Its main component was the CCF. The CCF was a group of data relations within a large data base and associated programs used to collect data from questionnaires and forms, process the data, and manage reports and listings. Data from the CCF were also transmitted electronically to the RCC.

The cost and progress system, provided DO managers with reliable and timely information regarding actual expenses in relation to budgeted expenses. This system consisted of the applicant file that ranked the employment status of persons tested for census positions, the payroll file that enabled intermittent employees to be paid on a weekly basis, and the personnel file which contained information from Form BC-50A PR, Notice of Short Term Employment. This system also was used to print special reports on EEO statistics, update the applicant file on the status of employees, and verify social security numbers (SSN's) on payroll forms.

### Data Collection Processing

The Bureau's objective for 1990 was to process the Puerto Rico questionnaires (September 4, 1990, to May 31, 1991) concurrently with the stateside ones rather than sequentially as it did in 1980. This approach resulted in more timely release of data for the island. Further, there was a commitment to release by June 30, 1991, data the Puerto Rico government could use for redistricting.

Questionnaires for Puerto Rico were keyable, but unlike those of the Mainland, were not FOSDIC readable. Using the sample of 1-in-6 (as in 1980), where enumerators used a long-form questionnaire for every sixth housing unit to enumerate households, the 1990 workload was about 1,066,000 short and 235,000 long forms in addition to ICR's (long and short), and MCR's and SCR's. Questionnaires were sorted by DO/ARA/block as the DO's completed all field and office operations. The questionnaires were then shipped by air to the JXPO, where the English write-in answers for I & O, place of work (POW), migration (MIG), place of birth (POB), and relationship questions were coded and the questionnaires were keyed for data capture, processing, and storage.

The JXPO began processing Puerto Rico census data on September 4, 1990. At this time Puerto Rico processing used the JXPO's existing processing units for operations that were common with those stateside. For example, keyers handled the stateside keying as well as the Puerto Rico keying. The JXPO had a Puerto Rico section under

the General Operations Branch for those operations that were unique to the Puerto Rico census processing (e.g., search/match and manual coding). The JXPO Puerto Rico staff had designated units for check-in, data preparation, clerical coding, keying, and quality assurance. The library contained separate sections for the Puerto Rico questionnaires. The Administration Branch handled all Puerto Rico staff matters, and the Processing Operations Branch oversaw training and QA (September 24-December 27, 1990) for Puerto Rico. All processing was completed by May 31, 1991.

The Puerto Rico DO's batched questionnaires by short/long form and ARA, using the 10-digit airbill number on the shipping boxes to check out the batched questionnaires. The JXPO keyed that same airbill number to receive/check in the questionnaire batches.

The JXPO checked in Puerto Rico materials through its CATS (control and tracking system) by DO/ARA. Questionnaires from GQ were checked in by their geography and GQ ID numbers. Address registers were checked in and sent immediately to the library for storage. Forms D-190, Search Record, were forwarded to the Search/Match (S/M) Unit, where household questionnaires were sorted by short/long form and by ARA and block. Clerks did the actual search/match between September 17, 1990 and February 15, 1991, using the following "search forms": ICR (D-20); MCR's, D-21; SCR's, D-23; Were You Counted? (WYC)<sup>11</sup>, D-25; Search Record, (D-190); and census questionnaires classified as WHUHE, D-1A and D-2A. The Parolee-Probationer Information Record (PPIR) was not used in Puerto Rico.

All SCR's were initially processed through the BAPO, but all stateside SCR's claiming a usual residence in Puerto Rico were transcribed onto Puerto Rico SCR's by the Puerto Rico and Outlying Areas Branch (PROAB) at headquarters and then sent to the JXPO for further S/M processing.

For the 1990 census, the Bureau implemented special S/M procedures to count households that were temporarily displaced because their "usual place of residence" was destroyed or damaged by a natural disaster. A number of Puerto Rico ARA's were treated as disaster areas as a result of Hurricane Hugo. Any household reporting a destroyed or damaged and uninhabitable residence in any one of these ARA's as their "usual residence" was counted as living at that location rather than where they were living temporarily. To accomplish this, given that many of these homes were completely destroyed, the JXPO created a "dummy" GQ at the block level in any "disaster ARA" to which a UHE or WYC address was assigned. For example, some households displaced by Hurricane Hugo were reported as UHE's through search forms (D-190's) or through WYC forms. The usual address was searched in the appropriate address register. If the address register corresponded to a

"disaster ARA" and the usual address was not found in the register, a "dummy" group quarters was created for that block to account for the household members missing from that block within that particular ARA. The workload for the S/M operation was approximately 15,200 forms.

Table 7. Estimated Workloads

| Forms                          | Keying    | Coding  | Search/Match |
|--------------------------------|-----------|---------|--------------|
| Short-form questionnaire ..... | 1,000,000 |         | 8,034        |
| Long-form questionnaire.....   | 200,000   | 200,000 | 1,646        |
| Short-form ICR.....            | 20,750    |         | 20,750       |
| Long-form ICR.....             | 4,250     | 4,250   | 4,250        |
| MCR.....                       | 3,600     | 3,600   | 3,600        |
| SCR.....                       | 100       | 100     | 100          |
| WYC.....                       | 1,134     |         | 1,134        |

### Post-Census Local Review

The post-census local review program, from July 23 to August 20, 1990, provided local officials in Puerto Rico an opportunity to review the initial census counts of HU and GQ population in their jurisdictions, as was done stateside (see ch. 6). Once these officials provided proper documentation of alleged discrepancies in the census counts as of April 1, 1990, the AO determined which blocks to recanvass. The DO recanvassed at least one block per municipio, whose government provided properly documented local estimates. Enumerators listed and interviewed persons at any missed units.

In preparation for this program, the Census Bureau, conducted two workshops with the representatives from the municipio governments on how to participate in the program. One workshop was held in the summer of 1989 and the other in February 1990. They focused on census definitions, geographic concepts, methods for creating comprehensive housing-unit estimates, and program schedules and procedures. These workshops provided the local government liaisons with detailed information on conducting the local review.

The Bureau issued its first of two local review booklets, 1990 Decennial Census Local Review Informational Booklet, for Puerto Rico on October 12, 1988. The FLD was responsible for its distribution. This booklet provided a general overview of the operation. The second booklet, 1990 Decennial Census Local Review Program Technical Guide, for Puerto Rico presented a more detailed discussion of the program. The Bureau distributed the Technical Guide to local officials during the second series of workshops. The DPLD adapted and translated both local review booklets and the training materials used during the workshops from the stateside version. The FLD was responsible for the preparation of all field-use manuals and training guides.

Using the GEO's software, the New York RCC plotted the local review maps and mailed them to the local municipios by certified mail, return receipt requested. The area office and the PRPB received copies of each local

<sup>11</sup>A campaign to identify and to enumerate those persons who believed they or members of their households were not included in the census.

review map for reference. The municipios received the precensus maps in the summer/fall of 1989 so that they could begin to prepare their housing unit estimates for census blocks.

The precensus local review maps showed the appropriate name, code, and boundary as well as the streets, waterbodies and other features that formed the boundaries of the census blocks and census tract/BNA's for each governmental unit. The political boundaries shown on these maps were based on the Legal Boundary Review. These boundaries would help local officials orient themselves to Bureau maps and geographic units—census tracts and census blocks. Using these maps, the local review officials developed or assigned their counts of housing units to the correct 1990 census geography.

The second set of maps (postcensus local review maps), which the Bureau distributed during the spring of 1990, showed the municipio and barrio (or barrio-pueblo) boundaries that local officials reported as being legally in effect as of January 1, 1990. These were the boundaries to be used to tabulate the data from the 1990 census.

After the DO's completed field operations (including the block split operation), headquarters generated the population and housing counts by computer on Form D-77 PR, Postcensus Local Review Listing. The D-77 PR provided counts at the block level for HU's and GQ population for the local officials to review and compare with their own estimates. This review was designed to identify major differences between the census counts and the local estimates. Preliminary figures were released in late July 1990, and in September, municipio officials had 25 workdays (including Saturdays) to review the census counts and notify the appropriate DO of any problems.

**Release of census results**—The area manager held a press conference when the local review counts for all municipios were released to the local officials on July 23, 1990. Preliminary population counts at the municipio and Puerto Rico level were provided for informational purposes as part of the Local Review Program. Based on the responses received from municipios, the DO's reviewed the documentation and estimates and determined which blocks to recanvass.

The postcensus local review recanvassing, beginning August 21, 1990, added 407 housing units. A total of 15,352 housing units in 352 blocks were recanvassed. The DO manager, responded to each governmental unit that had requested a review and had provided properly documented local estimate(s). These responses told the local officials how their complaints were handled but did not specify the number of units that were added, deleted, or transferred based on field operations. The latter information was not available at this stage of the operation. The DO manager supplied the number of blocks and/or a list of blocks where recanvassing was conducted. Twenty-eight out of the 78 municipio governments responded with bona fide challenges to the postcensus Local Review Program.

## Post-Enumeration Survey (PES)

The PES for Puerto Rico, designed to produce estimates of the net undercount of persons in the census by matching the independent PES records with those in the census, was operationally similar to the PES for the United States (see ch. 11). The survey sample consisted of two parts. The first was a P [population] sample, which consisted of all persons listed in PES sample blocks at the time of the PES interview. The P-sample was used for estimating the percentage of persons not matched to the census, i.e., gross undercount. The second part was the E [enumeration] sample, which consisted of all census enumerations assigned to the sample blocks by the census process. The E-sample was used for estimating the percentage of persons erroneously enumerated in the census, i.e., gross overcount. This overcount included census duplicates, fictitious enumerations, persons born after Census Day, persons enumerated in error, and persons enumerated in the wrong geography. The estimates of gross undercount and gross overcount were combined to form an estimate of the net undercount.

The PES sample of 4,000 housing units in 139 block clusters in 135 ARA's was treated in a similar manner as for stateside list/enumerate areas except that the area office in San Juan did the listing and interviewing. Listing was done during May of 1990; field interviewing was done in June-July. The field office work, quality assurance, and transmittal process were the same as stateside. The subsampling to reduce Puerto Rico's large-sized blocks to manageable workloads was done in the area office instead of in the processing center. As work returned from the field, the interview forms went through an interview QA operation (see ch. 11). A failure occurred when key items failed edit or when there were different people in the QA reinterview roster.

After the interview forms were keyed, the match forms were printed. There was no computer matching in Puerto Rico. One set of match forms was printed with only the P-sample information. Another set of match forms was printed with the E-sample information. The matching clerks matched addresses and then persons within them. The movers were processed basically the same way as stateside movers. Instead of generating copies of the census questionnaires for movers, the original census questionnaires were obtained, since they were geographically sorted. As in stateside, there was a late census-data matching operation. The search area was defined as one "ring" around the sample block(s) in urban and suburban areas and two "rings" around the sample block(s) in rural areas.

The JXPO prepared followup forms for persons requiring additional information and shipped them to the Area Office. The interviewers were assigned households which were close to their homes, if possible. If an interviewer found a case where the housing unit was vacant at the time of followup, he or she attempted to find someone knowledgeable about the household. The interviewer obtained

the name and telephone number of the respondent in case it was necessary to contact that person again. The crew leader met with each interviewer as often as necessary to review progress and collect and distribute work. As in stateside, there was a QA of the followup operation (see chapter 11).

When the followup forms were received in the JXPO, they were processed through after-followup matching and coding the same way as stateside was processed. The after follow-up coding was reviewed by matching review specialists for selected clusters. Missing data were imputed and estimates of the net undercount were produced for 21 poststratification variables. These poststrata were defined by place type (3) and age/sex (7) categories [21]. The three types of place were as follows:

1. Central city areas in MA's and PMA's
2. Noncentral city areas in MA's and PMA's
3. Non-MA/PMA areas

The seven age/sex categories were as follows:

1. Males and females, age 0-17
2. Males, age 18-29
3. Females, age 18-29
4. Males, age 30-49
5. Females, age 30-49
6. Males, age 50 and over
7. Females, age 50 and over

The estimated net undercount for each of these poststrata are given in the following table.

**Table 8. Percent Net Undercount by Place Type, by Age/Sex**

| Age/sex  | Central Cities in MA's | Non-Central Cities in MA's | Not in MA's | Total |
|----------|------------------------|----------------------------|-------------|-------|
| 0-17 M+F | -0.2                   | 6.9                        | 3.7         | 4.7   |
| 18-29 M  | 3.9                    | 3.5                        | 7.7         | 4.5   |
| 18-29 F  | 0.4                    | 4.8                        | 6.1         | 4.1   |
| 30-49 M  | 6.4                    | 9.0                        | 1.2         | 6.9   |
| 30-49 F  | -0.5                   | 4.1                        | 1.6         | 2.5   |
| 50+ M    | -2.6                   | 4.8                        | 4.9         | 3.0   |
| 50+ F    | -4.6                   | 4.2                        | 0.3         | 0.9   |
| Total    | 0.1                    | 5.7                        | 3.6         | 3.9   |

The net undercount for Puerto Rico was estimated to be 3.9 percent, compared to the 1.6 percent undercount estimated for the Mainland United States. The undercount in non-MA's, estimated at 3.6 percent, approximated that for the entire island. The highest undercount by place type, 5.7 percent, was for noncentral cities in MA's.<sup>12</sup> Percentage estimates for six of the seven age/sex poststrata in

<sup>12</sup>The noncentral cities place type in Puerto Rico is not comparable to the "other urban" place type in the Mainland. In Puerto Rico, noncentral cities in MA's/PMA's included more densely populated areas with difficult to enumerate housing units. In the Mainland, the "other urban" place type included many suburban areas with easier to enumerate housing units.

these areas were higher than the island total, with males 30-49 years old being the most undercounted, at 9 percent. Central cities in MA's, at 0.1 percent, were the least undercounted, attributable in part to apparent overcounts in the 50+ strata.

## Tabulation and Publication (TAB/PUB)

The 1990 census TAB/PUB program for Puerto Rico was designed to provide extensive population and housing data to meet a wide variety of needs for different segments of the data-user community—Federal agencies, commonwealth and local government agencies, academic researchers, business and marketing analysts, and private organizations and individuals. Data presentation in the 1990 products followed all or part of the hierarchy of the island's census geography: Commonwealth of Puerto Rico, municipio, municipio subdivision (barrio and barrio-pueblo), place-(zona urbana and comunidad), census tract/block numbering area (BNA), block group, and block. The Bureau also presented data at separate summary levels for other areas including subbarrios, metropolitan areas (MA's), primary metropolitan areas (PMA's), the San Juan-Caguas consolidated metropolitan area (CMA), and urbanized areas (UA's). The Bureau provided redistricting counts at the block level for Puerto Rico by the end of June 1991 to the chief justice of the Puerto Rico Supreme Court and leaders of the Popular Democratic, New Progressive, and Pro Independence Parties.

The 1990 TAB/PUB design was similar in geographic coverage and content to 1980 but produced the data products on an accelerated schedule and in many cases issued the products in additional formats. The formats and sequence for the Puerto Rico data were decided in consultation with the PRPB and the interagency committee. For 1990, the Bureau produced printed reports and machine-readable data in several forms—magnetic tapes for mainframe microcomputers, microfiche, and through its online system, CENDATA™. With the increasingly widespread use of microcomputers and CD-ROM (computer discs, read-only memory) readers, the Bureau decided to limit microfiche for 1990 to the paper reports and just a few of the summary tapes described above, and devote the resources to CD-ROM instead.

For a fee, users could order paper printouts from tape, obtain selected items and excerpts online through CENDATA or facsimile transmission, or utilize their State data centers. (For further information, see ch. 10.) The published maps for Puerto Rico were published in English and Spanish; the TIGER System was used to generate boundary outline maps that showed each geographic area. The DPLD and the DUSD published and distributed free informational brochures (series 1990 CPH-I) that described the various 1990 census products. (See ch. 10.) The following brochures were specifically of Puerto Rico:

- 3PR. "Introduction to 1990 Census Products for Puerto Rico." Two four-page versions, English (E) and Spanish (S), November 1991.
- 4PR. "1990 Census of Population and Housing Tabulation and Publication Program for Puerto Rico." One 32-page brochure in English and Spanish, October 1991.

## Printed Reports

Printed reports containing final 1990 census data were issued in paperback—or "soft cover" or "softbound" series described below (with appropriate maps) beginning in January 1992; there were no hardbound volumes. All reports for Puerto Rico were in Spanish and English.<sup>13</sup> Printed reports were published by the following series, report numbers, and titles:

### 1990 Census of Population and Housing

#### 100-Percent Data

1990 CPH-1-53:

Summary Population Housing Characteristics. Total population and housing unit counts as well as summary statistics on age, sex, household relationship, units in structure, number of rooms, plumbing facilities, tenure, value of home or monthly rent, and vacancy and characteristics for Puerto Rico, each municipio, barrio-pueblo and barrio, subbarrio, and place. The comparable 1980 census reports were Preliminary Population and Housing Unit Counts (PHC80-P-53), Advance Final Population and Housing Unit Counts (PHC80-V-53), and Summary Characteristics for Governmental Units and Standard Metropolitan Statistical Areas (PHC80-3-53, 100-percent portion only).

1990 CPH-2-53:

Population and Housing Unit Counts. Total population and housing unit counts for 1990 and previous censuses. Data were shown for Puerto Rico, each municipio, barrio-pueblo and barrio, subbarrio, place, MA, UA, and summary geographic area (for example, urban and rural, and metropolitan and nonmetropolitan residence). The comparable 1980 census report was Number of Inhabitants (PC80-1-A53).

#### 100-Percent and Sample Data

1990 CPH-3:

Population and Housing Characteristics for Census Tracts and Block Numbering Areas. Data for most of the population and housing subjects in the 1990

census. Some tables were based on the 100-percent tabulations, others on sample tabulations. One report was published for each MA and PMA, and one for the nonmetropolitan balance of Puerto Rico. Statistics were presented in a geographic hierarchy of municipio-place of 10,000 or more inhabitants-census tract/block numbering area BNA. The 1990 reports for Puerto Rico were: Arecibo-MA (1990 CPH-3-72), Aguadilla-MA (1990 CPH-3-59), Caguas-PMA (1990 CPH-3-295A), Mayagüez-MA (1990 CPH-3-223), Ponce-MA (1990 CPH-3-264), San Juan -PMA (1990 CPH-3-295B), San Juan - Caguas-MA (1990 CPH 3-295), and Puerto Rico-Outside Metropolitan Areas (1990 CPH-3-53). All maps (packaged separately) were issued between November 1992 and January 1993. The comparable 1980 census report was PHC80-2.

#### Sample Data

1990 CPH-5-53:

Summary Social, Economic, and Housing Characteristics. Sample population and housing data for Puerto Rico, each municipio, barrio-pueblo and barrio, subbarrio, and place. This report was designed to meet those data needs fulfilled by the 1980 Summary Characteristics for Governmental Units and Standard Metropolitan Statistical Areas (PHC80-3-53, sample portion only). The report was released in March 1993.

### 1990 Census of Population

#### 100-Percent Data

1990 CP-1-53:

General Population Characteristics. Detailed statistics on age, sex, marital status, and household relationship characteristics for the island; each municipio; MA, UA; barrio pueblo and barrio, subbarrios, and place of 1,000 or more inhabitants; and summary geographic areas. The comparable 1980 census data were found in General Population Characteristics (PC80-1-B53).

#### Sample Data

1990 CP-2-53:

Social and Economic Characteristics. Focused on the population subjects collected on a sample basis in 1990. Data were shown for Puerto Rico; each municipio; MA; UA; barrio-pueblo and barrio, subbarrio, and place of 2,500 or more inhabitants; and summary geographic areas. (The comparable 1980 census report was General Social and Economic Characteristics (PC80-1-C53).

### 1990 Census of Housing

#### 100-Percent Data

1990 CH-1-53:

General Housing Characteristics. Detailed statistics on units in structure, plumbing facilities, value and

<sup>13</sup>The volumes had double covers, one cover with text and tables on both sides of the pages in one language. The user then could turn the volume over to the other cover and read the same material in the other language.

rent, number of rooms, tenure, and vacancy characteristics for Puerto Rico; each municipio; MA; UA; barrio-pueblo and barrio, subbarrio, and place of 1,000 or more inhabitants; and summary geographic areas. The comparable 1980 census data were found in General Housing Characteristics (HC80-1-A53).

## Sample Data

1990 CH-2-53:

Detailed Housing Characteristics. Focused on the housing subjects collected on a sample basis in 1990 for Puerto Rico; each municipio; MA; UA; barrio-pueblo and barrio, subbarrio, and place of 1,000 or more inhabitants; and summary geographic areas. (The comparable 1980 census report was Detailed Housing Characteristics, HC80-1-B53.)

## 1990 Census Machine-Readable Products

**Summary tape files**—Four summary tape file (STF) series were prepared for Puerto Rico. The STF's were comparable in subject content and geographic coverage to STF's 1 through 4 produced from the 1980 census.

### 100-Percent Data

**STF 1** STF 1 included 100-percent population and housing counts and characteristics similar in content but with more detail than the 1980 STF 1 for Puerto Rico. There were two files:

File A contained data for Puerto Rico and its component areas in hierarchical sequence down to the block group level. Summaries also were tabulated for each whole barrio-pueblo and barrio, whole subbarrio, whole place, whole census tract/block numbering area, and whole block group. The tape and microfiche were issued in August 1991. The DUSD reproduced extracts from STF 1A on paper on demand in the 1990 CPH-L-4 series. The compact disc, read-only memory (CD-ROM), including "redistricting data," was released in April 1992.

File B provided data for Puerto Rico and its component areas in hierarchical sequence down to the individual block level, and each MA, UA, and summary geographic areas (for example, urban and rural, and metropolitan and nonmetropolitan residence). The release date was November 1991, with extracts on CD-ROM.

**STF 2** STF 2 contained 100-percent population and housing characteristics similar to the 1980 STF 2. This file showed more subject detail than STF 1. There were two files:

File A had data for each census tract/BNA in MA's and in the remainder of Puerto Rico in a geographic hierarchy of municipio—place of 10,000 or more inhabitants—census tract/BNA. It also presented a census tract/BNA summary for each split census tract/BNA. The release date was April 1992.

File B was an inventory-type file (each municipio, each place of 1,000 or more inhabitants, and so forth) rather than hierarchical in structure. Data were presented for Puerto Rico; each municipio; MA; UA; barrio-pueblo and barrio, subbarrio, and place of 1,000 or more inhabitants; and summary geographic areas. The release date was August 1992.

## Sample Data

**STF 3** STF 3 included sample population and housing characteristics similar in content to the 1980 STF 3, but expanded for 1990. There was one file (A) in this series for Puerto Rico, with data for the island and its subareas in hierarchical sequence down to the BG level. There were separate summaries for each MA, UA, whole barrio-pueblo and barrio, whole subbarrio, whole place, whole census tract/block numbering area, and whole block group. The issue date was January 1993. There was no file B (ZIP Codes); the Puerto Rico STF 3 also appeared on CD-ROM and microfiche.

**STF 4** STF 4 contained sample population and housing characteristics similar in content to the 1980 STF 4. Showing more subject detail than STF 3, STF 4 had two files, both issued in late 1993: File A provided data for census tracts/BNA's in MA's and in the remainder of Puerto Rico in a geographic hierarchy of municipio—place of 10,000 or more inhabitants—census tract/BNA. It also presented a census tract/BNA summary for each split census tract/BNA. File B was an inventory-type file (each municipio, each place of 2,500 or more inhabitants, and so forth) rather than hierarchical in structure. It had data for Puerto Rico; each municipio; MA; UA; barrio-pueblo and barrio, subbarrio, and place of 2,500 or more inhabitants; and summary geographic areas.

**Public-use microdata samples (PUMS)**—The PUMS were computerized files containing most population and housing characteristics shown on a sample of individual census records. These files contained no names or addresses, and geographic identification was sufficiently broad to protect confidentiality. Microdata files allowed the user to prepare customized tabulations. Puerto Rico PUMS were released on tape only, in July 1993.



#### 5 Percent—

**Municipio Groups.** This file presented most population and housing characteristics on the sample questionnaire for a 5-percent sample of housing units. It showed data for municipio groups or smaller areas with 100,000 or more inhabitants in the 1990 census. This file was similar to the 1980 PUMS-A sample.

#### 1 Percent—

This file presented most population and housing characteristics on the sample questionnaire for a 1-percent sample of housing units. It showed data for MA's or smaller areas with 100,000 or more inhabitants in the 1990 census. This file was similar to the 1980 PUMS-B sample.

**1990 Census of Population and Housing Equal Employment Opportunity (EEO) File (Puerto Rico)**—The 1990 EEO file was based on civilian labor force data from the 1990 decennial census. The file contained two sample-based sets of tabulations. The first set was a cross-tabulation of 512 detailed census occupation by sex. The second set was a cross-tabulation of the same occupations by sex with educational attainment for selected age groupings. The data were issued on tape, CD-ROM, and paper copies in March 1993.

**Redistricting Data File**—This file presented the counts available from the special computer tape file designed and formatted for use in legislative redistricting. The counts, for areas as small as blocks, block groups, and voting districts, had totals for population; population 18 years and over; and total, vacant, and occupied housing units. This was a new product for 1990. The release date of the tape was July 1991 and CD-ROM, March 1992. (Although the Bureau was not required by law to provide the apportionment counts for Puerto Rico by December 1990 or redistricting (P.L. 94-171) counts by April 1991 (the PL "type" of data file for Puerto Rico did not follow the regular naming conventions), it did so by agreement.

**County-to-County Migration File**—This file provided summary statistics for Puerto Rico migration streams by municipio. Each record included codes for the geographic area of origin, codes for the geographic area of destination, and selected characteristics of the persons who made up the migration stream.

**Special Tabulations**—As in the past, there were numerous requests for data that were not available from the standard products (limited uses/users). They required tabulations from the internal detail files and were produced on a cost-reimbursable basis. These tabulations were requested by a wide variety of users, including Federal agencies who had unique data needs for the allocation of funds for a variety of programs. For example, the Department of

Housing and Urban Development (HUD) requested a special tabulation on Puerto Rican poverty, and the Legal Services Corporation, Puerto Rico, requested data useful in serving its constituents.

**Topologically Integrated Geographic Encoding and Referencing (TIGER) File**—Extracts from the TIGER data base, the automated geographic data base used by the Bureau for producing 1990 census maps, were available to the public in several formats. One series of extracts of selected geographic and cartographic information was called the TIGER/Line™ files. These contained, for each feature (e.g., the various individual segments that make up roads and rivers), information such as geographic areas codes, latitude longitude coordinates of features and boundaries, and the name and type of each feature. These TIGER/Line files were issued on computer tape July 1991 and on CD-ROM September 1992.

### Maps

Maps developed for the 1990 census were produced by the TIGER System, as were all other 1990 census geographic products, in 1991-93, in two ways: electrostatically plotted (computer generated) and printed. The maps designed for use with the data the Bureau tabulated appeared in or accompany printed data reports, data microfiche, summary tape files, and CD-ROM's. Electrostatically plotted maps were sold separately from the printed reports, microfiche, computer tapes, and CD-ROM's. They included the following:

**Municipio Block Maps (1990)**—These large-scale, municipio-based maps showed the greatest detail and the most complete set of geographic information. They displayed block numbers, along with tabulation-area boundaries and ground features (such as roads and streams).

**Municipio Subdivision Outline Maps (1990)**—Showed the names and boundaries of all municipios, municipio subdivisions, and places for which the Bureau tabulated data in the 1990 census. The maps, published in smaller scale, sectionalized form in some reports, also were available as electrostatic plots.

**Census Tract/Block Numbering Area Outline Maps (1990)**—These municipio-based maps showed census tract/BNA boundaries and numbers, the features underlying these boundaries, and the names of those features. They also showed the boundaries and names of municipios, municipio subdivisions, and places. These maps were available as electrostatic plots, but were replaced in late 1992 by a printed version that was sold by GPO.

**Voting District Outline Maps (1990)**—These municipio-based maps showed voting district codes and names, voting district boundaries, the features underlying these boundaries, and the names of those features. They also showed the boundaries and names of municipios, municipio subdivisions, and places. These maps were available



only as electrostatic plots for those municipios for which Puerto Rico delineated voting districts in the Bureau's Voting District Program.

**Puerto Rico Urbanized Area Boundary Maps (1990)**—An electrostatic plotter map was available for each 1990 census UA showing the UA boundary and the names of those features making up the UA boundary. These maps also displayed the boundaries and names of Puerto Rico, its municipios, municipio subdivisions, and places.

The following maps appeared, as appropriate, in the printed reports:

**Puerto Rico Metropolitan Area Outline Maps and Location Index**—This page-size, Puerto Rico-based map series displayed the boundaries and names of municipios, MA's, CMA's, and PMA's. It showed the location and name of the capital (San Juan) and the locations and names of each MA central city and other large places in Puerto Rico.

**GE-90 Map Series**—Municipio Subdivision Outline Map—In addition to the thematic maps included in the printed reports, a wall-size (46" x 30") map of the municipio subdivision displayed various characteristics from the 1990 Puerto Rico census.

### **1990 Puerto Rico Promotional Program (PRPP)**

The effectiveness of a population count or survey depends on the cooperation of the persons providing the requested information. The objective of the 1990 census promotional program was to obtain this cooperation. The Bureau held two outreach meetings in Puerto Rico with local officials and the private sector in 1987. Participants evaluated the 1980 census processes and products and suggested changes to improve public participation in 1990 by increasing awareness of the importance of the census. The Bureau also conducted a number of planning meetings with local officials to examine specific census-related issues. Following their recommendations and those of private-sector representatives, the Bureau embarked on a comprehensive promotion program.

A promotional program tailored to Puerto Rico was developed because of the special census operations and cultural, linguistic (predominantly Spanish instead of English), geographic, and social differences between the Commonwealth and the Mainland. The island population, now about 3.4 million, had been counted in each decennial census since 1910 but had never had a census promotional effort targeted to its particular needs. For an area 100 miles long by 35 miles wide with an extensive road network, the geography of Puerto Rico did not present any significant communication problems. The media were modern and comparable to those elsewhere in the United States. Stateside (i.e., English) promotional functions and tasks had to be replicated, as did support activities, such as the

Community Awareness and Products Program (CAPP). Three locally hired CAPP specialists began in September 1988 to work with civic and social organizations; community, religious, and educational leaders; and the media. The CAPP specialists were based in the San Juan area office and traveled throughout the island.

**Program concept and strategy**—The basic concept applied was that, given the limitations of time and support resources, the entire 1990 census promotion in Puerto Rico be essentially a community effort. The Bureau would provide technical promotional guidance and support, but the bulk of the work was to be done by the island community. The primary assumption was that every community sector would help disseminate the census message to its members and motivate them to cooperate. The aggregate of constituencies reached would determine the total of the population receiving the message. Under this concept, it was necessary to involve all types of organizations, not only those with funds to support promotional projects or that traditionally provided public service.

From a model involving all sectors, a strategy emerged to utilize the internal communication means of as large a number of organizations as possible to deliver the census message. Rather than rely on a few large projects dependent on scarce promotional resources, the emphasis was on recruiting organizations, motivating them to develop and manage their own promotional program/projects, and providing technical and consultant support in lieu of resources. Well-known and respected organizations would be asked to utilize census promotional logos, slogans, theme, graphics, and wording in their own advertising campaigns. This would ensure that the message was correct, consistent, and continuously reinforced.

**Advertising campaign**—The advertising or publicity campaign was the cornerstone of the PRPP in that it set the tone, provided a unifying theme, and had the widest reach of all program components. This was one of several campaigns developed under the auspices of the Ad Council on behalf of the 1990 census (see ch. 5). In March 1989, the Ad Council selected West Indies & Grey, a Puerto Rican advertising agency, to specifically design a campaign for the island as a public service. This was a "double first"—the first census advertising campaign in Puerto Rico and the first Puerto Rican agency to carry out an Ad Council-sponsored public-service campaign.

Development of the campaign was completed by early 1990, and it received an early "kickoff" on January 19, 1990. The campaign design was presented to and approved by the Ad Council Campaign Review Board, the Department of Commerce, and the Census Bureau. Presentations were also made to the Bureau's New York regional representatives, a member of its Hispanic advisory committee from Puerto Rico, and representatives from the Commonwealth Governor's staff and agencies.

The basic concept was to keep the message simple, but factual, and to emotionally involve the target audience. The basic message was that the census was of vital importance in ensuring a better future for the community and individuals. The concept was directly aimed at what was seen as a pervasive lack of awareness about the census among the general public. The theme, symbols, and text had to work together to gain not only awareness and understanding, but also identification with the census and its purpose. Accordingly, the campaign stressed that it was a census for the benefit of the island and its future. The public-service announcements (PSA's), for example, used babies as symbols of this future with which all could identify.

**Results**—PSA's ran in print media and on radio and television from January 19, 1990, through May 1990. Announcements were aired or printed daily, seen or heard during prime time, and occasionally multiple ads would be printed in one edition. The West Indies & Grey media allocation reports to the Ad Council detailed the media presence for the 1990 census. For television and newspapers, the Public Records Service was used as the main source regarding the number of TV spots and column inches for dailies. The media presence was measured in terms of number of insertions and rate-card dollars.

For the key months of February and March (see table 8), some of the specifics were:

- Seven television stations aired 1,293 spots for a total rate-card value of \$349,500.
- The four dailies with island-wide circulation printed during these same months 2,494 column inches of 1990 census advertisements for a value of \$89,526.
- Six magazines printed 20 insertions of full-page color ads in their issues during that period for a total value of \$32,955.
- Only the 9 largest of 95 radio stations were asked for reports; they aired 3,976 spots for a value of \$145,017.
- Outdoor advertising included 33 bus shelter sides and 415 transit advertisements (buses) for 2 months, for a total value of \$44,450.

**Table 9. Media Investment in the 1990 Puerto Rico Promotion Program, January-March 1990**

| Medium           | January   | February  | March     | Total     |
|------------------|-----------|-----------|-----------|-----------|
| Total .....      | \$236,891 | \$325,813 | \$335,725 | \$898,429 |
| Print .....      | 39,992    | 40,539    | 48,987    | 129,518   |
| Magazine .....   | 19,540    | 13,940    | 19,015    | 52,495    |
| Radio .....      | 71,590    | 71,590    | 73,427    | 190,203   |
| Outdoors .....   | 15,210    | 22,270    | 22,270    | 59,750    |
| Television ..... | 116,963   | 177,474   | 172,026   | 466,463   |

Not included in the above are the spots aired by 1 of the 11 largest radio stations, which did not keep track of its PSA's, and the contribution of many regional and specialty newspapers, like *Caribbean Business News*. This weekly newspaper donated an estimated \$100,000 in 1990 census advertisements.

Also, the TV and radio spots were aired in many programs sponsored by joint-venture participants as part of their commitment to the PRPP. This advertising was not included in the above results but was considered significant.

**Promotional products**—Because the predominant language was Spanish instead of English, and social characteristics varied, there had to be a complete set of informational and promotional products. Most of the latter were developed by West Indies & Grey to complement the advertising campaign in the vernacular Spanish of Puerto Rico. Other products, mostly informational in nature, provided basic information that could be reproduced and adapted for a newsletter articles, informational fliers, letters, press releases, etc. The private sector, government agencies, and the census organizations all distributed these products. For example, several wholesalers sent posters and other materials to small neighborhood retailers, along with their deliveries of merchandise, for display and handing out to shoppers. To complement the wholesalers, the American Legion distributed posters to small businesses in the town centers and the CAPP staff supplied them to the local governments.

A products automated distribution system (off-the-shelf Apple software, specifically the mid-level data base program called Filemaker II) was used to allocate and track the diverse products in varying quantities that had to be sent to 86 distributing organizations. Another 37 allocations were managed by another system based on this system and developed by the Puerto Rico Planning Board for its own equipment. The Puerto Rico General Services Administration, provided a driver and a vehicle from time to time during the distribution period (January - February, 1990) and the New York regional office detailed two clerks for 3 weeks to assist. Most of the joint-venture participants collected the products they were to distribute.

**Joint ventures**—The approach in joint ventures was two-fold: First, reach associations that could involve large numbers of organizations and/or individuals in promoting the 1990 census, e.g., chambers of commerce or similar associations that could act as "multipliers" of the marketing effort. Second, market the joint-venture concept among the largest commercial and civic organizations in Puerto Rico.

The basic approach was personal contact with prospective participants, with the appeal tailored to the type of organization. Staff made a formal proposal with rationale for commitment and a time schedule. All prospective participants contacted agreed to support the 1990 census by developing and implementing promotional projects designed to reach their members, employees, clients, suppliers, and/or the general public in accordance with the schedule and to use the standard census logo and information. A total of 68 private sector organizations participated, for an estimated coverage of 57.3 percent of the population—every individual would receive the census message from five to six times from joint venture activities. Most of the participating businesses were among the 100 largest in Puerto

Rico. A post-promotional effectiveness survey indicated that, for the most part, the participants carried out their commitments, actively promoted the census, and would assist again.

**Government participation**—The census office in the Planning Board coordinated and managed the total government participation by means of an interagency census promotional committee. A total of 37 government agencies and State data center affiliates participated in the government promotional program and implemented approximately 137 separate initiatives.

On January 19, 1990, the Governor of Puerto Rico proclaimed 1990 as "Year of the Census" in an organized and publicized ceremony. The primary purpose was to signal the start of the promotion effort and energize all government agencies in their participation. The Governor stated that the government would take the lead in promoting the census. Department heads and each agency's member of the Interagency 1990 Census Promotional Committee were invited to attend; the committee met on the next working day to begin its planning.

**Individual projects**—Additional components, tasks, or projects were designed to meet new or unanticipated requirements.

**Religious project**—The purpose of this project was for religious leaders to make an appeal to their congregations on Census Day and the following Sundays. The DPLD obtained a commitment from the Roman Catholic Church to support this initiative. Talking points for religious leaders were developed and the project was expanded to hundreds of other churches in urban and rural neighborhoods. CAPP personnel sent letters requesting assistance and provided talking points to the Catholic and other churches via the five largest of their associations. This project significantly increased the reach of the promotion and the credibility of the message.

**1990 Census Commemorative Serigraph Project**—This project recognized and thanked external organizations and individuals who significantly contributed to the promotion effort. The project was considered a unique opportunity to build on the success of the census in Puerto Rico and enhance the Bureau's image in the following years. West Indies & Grey, under the Ad Council's auspices, sponsored a serigraph (silk-screen poster) contest among students at the University of Puerto Rico School of Plastic Arts. An independent panel selected the winners. The first-place winner then reproduced and signed a limited edition of 400 copies.

In a single ceremony in an outdoor pavilion, national and regional Census Bureau officials spoke, rewarded contest winners, and presented the signed poster copies to representatives of each sector of the island community. Approximately 200 persons, including census personnel, attended. One of the major joint-venture participants, the Bacardi

Corporation, provided the facilities and refreshments at no cost to the Bureau. The PRPP manager acted as liaison and assisted in preparing guest lists and mailing.

**Printers project**—This was a test project to involve printers in the promotion of the 1990 census through a low-cost mailing effort by having them include the census message and/or logo in printed products, e.g., calendars. In response to 40 letters sent, 7 printers returned a completed form indicating they would participate. There was no followup on this project, but the response indicated that an earlier mass-mailing appeal with personalized followup could result in a large promotional payoff.

**Mass mailing project**—Like the printers project, the mass mailing project was an effort to involve in joint ventures those organizations that could not be approached directly due to lack of personnel time. They were requested to implement their choice of promotional initiatives and informed that there would be no followup unless they needed assistance. They were also provided with informational and art material they could use. The project consisted of mailing a letter to organizations similar to those recruited personally, formally requesting their support of the promotion effort by disseminating 1990 census information/ messages by their internal means of communication and other promotion projects. A copy of the joint venture information packet and a list of potential projects were included. Addressees were asked to advise if they would participate. A number of firms responded, and one corporation requested assistance (promotional products for display), and as a result of followup expanded its commitment and was included in the joint venture program. The effectiveness of this project was not evaluated.

**Census education project**—An important activity originated by the DPLD, the 1990 Census Education Project ("Proyecto Escolar para el Censo de Puerto Rico: 1990"), sought to reach primary and secondary students in Puerto Rico's public, private, and parochial schools (about 2,100) through materials that would inform these students about the census. One kit was sent per school, with copies to school district superintendents and other school system officials. It was anticipated that this would increase awareness of the census' importance and stimulate household response. This 1990 packet of educational materials, tailored for Puerto Rico from the stateside version, was reusable in the classroom. It contained nine lesson plans, all in Spanish, for grades K-12 in the areas of social studies, mathematics, sciences, and language. The Bureau hoped to develop in the students, a knowledge and comprehension of the importance of the census, the civic responsibility of responding to the census, the confidentiality of the census responses, and an appreciation of the importance of census statistics in their daily lives.

Planning began in 1987, among the Bureau, the Commonwealth Secretary of Education, and the Puerto Rico Planning Board. The Secretary named a liaison on his staff to aid the Bureau in distributing the education project

materials and implementing the project during the 1989-1990 school year. To evaluate the effectiveness of the CEP, an evaluation was planned, but never implemented due to cost restrictions and the need to allocate census staff to other projects.

**Complete count program**—This program, similar to the one stateside (see ch. 5), encouraged the involvement of local officials and influential members of the community in promoting census awareness and education to help produce a complete census count. The Bureau invited each municipio to organize a complete count committee (involving local officials, government agencies, members of the community) to coordinate an educational campaign to promote the census.

**Private sector project**—The Bureau involved corporations and philanthropic organizations in underwriting selected promotional/educational projects for the 1990 census. Some corporations helped finance projects and promotional materials such as buttons, stickers, pencils, and similar items that served to complement and improve census outreach activities. These organizations included promotional messages on their products such as census logos on the employees' checks or on bills to their clients. Of 105 questionnaires sent after the campaign to private-sector and governmental organizations that participated, 39 were returned for a 37-percent response rate. The responses revealed that for the most part, participants met their commitments, were appreciative of the scope and quality of census promotion, and participated over several months.

## Census Evaluation and Coverage Improvement

**1990 Puerto Rico Content Reinterview Survey**—The 1990 Puerto Rico Content Reinterview Survey (PRCRS) contacted 1,600 households and asked in-depth questions about population and housing characteristics to test the quality of data initially collected and to measure response error. The questions included those specific to the Puerto Rico forms—time spent in the States, vocational training, condominium status, and condition of housing unit. This was the first such survey in Puerto Rico. It compared responses from household members who were living in the sample unit on Census Day to responses for the same members during the survey. To reduce extraneous interviewing, population data were collected only in sample households which were determined at survey time to contain at least some of the Census Day occupants. Housing data were collected from every sample unit. The field method for the survey was personal visit or telephone contact, if possible, and used a Spanish version of the special reinterview questionnaire.

The DOD identified the PRCRS sample and generated an output file containing the CCF data for the housing units to be sampled. The STSD provided specifications for the sampling. The DOD coded and keyed the resulting questionnaire survey data and generated an output for the final coded and keyed data. The DOD also produced an extract

of the Puerto Rico Data capture file and the edited detail file for the Puerto Rico sample households. The FLD did the enumeration. This included the formation of interviewer assignments, development of the interviewer's manual and self study, interview training, production of office manuals, data collection, administration of the QA procedures, progress reports, and the shipment of field materials. The DPLD assisted the STSD in the planning and development of the survey. The DPLD translated the 1990 PRCRS questionnaire, advance letter, and the interviewer's manual and self study into Spanish.

The Forms Design and Mail Management Branch of the APSD managed the printing of the PRCRS questionnaire, form D-1010 PR(E) English version and D-1010 PR (S), Spanish version, and the survey advance letter. The questionnaire was approximately equal in length to a standard long-form census questionnaire. It contained 89 respondent questions, 9 interviewer check items, and 4 items to be completed by observation on the condition of the unit.

**Operations**—Four members of the Bureau's STSD staff went to Puerto Rico during the weeks of July 9 through July 20, 1990, to obtain address information for the PRCRS sample housing units. The mailing addresses collected from the nine DO's ARA listing books were used to mail out the survey advance letter and assisted field representatives in locating the sample unit addresses.

Bureau staff brought two laptop computers with dBASE III software for use in combining the address information for the sample units with a DOD-generated file containing the census geography but not the mailing addresses. The STSD sent three boxes of supplies to the Puerto Rico area office—the printed copies of the Spanish advance letter for the Puerto Rico CRS, pin-feed self-adhesive labels for the advance letter envelopes, 200 copies of the advance letter in English for the survey enumerators, and 2,000 envelopes with the AO return address for mailing the letters. In July, STSD staff used a PC (personal computer), while in the AO, to print the advance letter mailing labels and the questionnaire identification labels and to modify some of the Bureau's programs, and clerks stuffed the advance letter envelopes with the survey advance letter, applied the mailing labels, and attached identification labels to the Spanish PR CRS questionnaires.

FLD interviewers visited each household in August 1990 for the initial contact to collect personal data, but telephone callbacks were encouraged to keep costs low. Up to three personal visits and seven telephone attempts were allowed to complete the questionnaire. Proxy data were acceptable after three contacts failed to obtain complete information. The first adult household member contacted supplied the roster of persons still living in the unit who were living there on Census Day. Demographic data only were collected for the persons listed on the roster. If the whole household had moved since Census Day, no personal data were obtained, but the interviewer was instructed to collect the housing information. Interviewer training involved both self-study and classroom time. The QA recheck was performed by

telephone by the PRCRS field supervisor. If any of the discrepancies for a particular enumerator were unusually high according to the field supervisor's judgment, the interviewer was required to do further followup.

**Puerto Rico Multiunit Structures Coverage Improvement Operation**—This operation was to determine the effectiveness of using an independent list to improve coverage of multiunit structures during the operation. The addresses for multiunit structures listed in the address listing books by census enumerators were compared to the addresses for multiunit structures from a mailing list of residential customers supplied by the Autoridad de Energía Eléctrica de Puerto Rico (Puerto Rico Electric Company). This operation (July 1990) was conducted in the four DO's comprising and surrounding the San Juan municipio, since the majority of large multiunit structures in Puerto Rico were located within this area. Eligible multiunit structures were defined as any structure with at least 50 apartment units located within the boundaries of the San Juan I, San Juan II, Bayamón, or Carolina DO's.

**Methodology**—The operation was completed in three steps. The first step was for clerks to use the basic street address or condominium name on the electric company's match list (form D-1020 PR) to geocode the multiunit structures to census geography. They used census maps, municipio locator maps, commercial index maps, and other geographic materials in the DO's to identify the ARA containing the basic street address.

The next step was to complete a two-part matching operation. In the first part, clerks compared the L/E address listings with the company mailing lists of residential customers. If the number of units for the structure listed in the address register was greater than or equal to the number of units for the structure listed in the mailing list, they did nothing. If the address listing book number was less than the number of units on the electric company list, clerks then completed the second step of the matching operation. This was a unit-by-unit match between the two listings to identify any electric company nonmatch(es) (e.g., units listed on the electric company listing, but not listed within the L/E address registers) for the respective structure.

**Evaluation and Results**—The goal of the Puerto Rico multiunit coverage improvement operation was to improve the coverage of address listings completed by the enumerators for the 262 multiunit structures found in the four DO's. This was done by matching these address listings from the address registers to the mailing list of residential customers supplied by the Puerto Rico Electric Company. The goal of this evaluation was to determine how complete the census enumerators listed addresses at the multiunit structures and determine the effectiveness of using this specific independent list to improve coverage.

The final outcome of this operation brought very minimal coverage improvement to the 1990 Census of Puerto Rico. With the completion of the matching and field operations (office geocoding and matching and field review operation),

there was a final coverage improvement of 143 units or 0.39 percent of the total number of listings. From this operation, the Bureau determined that the address listing books were more comprehensive than the electric company listings in providing a complete list of possible addresses found within the 262 multiunit structures.

## VIRGIN ISLANDS AND THE PACIFIC ISLAND TERRITORIES

### Introduction

Title 13 of the U.S. Code provided the legal authority to include the Virgin Islands of the United States and the Pacific Outlying Areas—(American Samoa, CNMI, Guam, and by special arrangement, the Republic of Palau) in the U.S. decennial census. It also gave the Secretary of Commerce the option of obtaining census information collected by the governor or highest ranking Federal official, if such information was obtained in accordance with the plans prescribed or approved by the Secretary.

Given the differences in the political, social, and economic characteristics of these areas, as well as their geographic distance from the Mainland, the Census Bureau conducted the 1990 Decennial Census of Population and Housing through agreements with each area government as it had done in the past. In general, the Bureau agreed to consult with the areas during the planning to supply all forms, questionnaires, procedures manuals and training guides, maps, other materials, and the necessary funds for the area governments to do the enumerating themselves. The Virgin Islands and Pacific Island Territories governments agreed to participate and cooperate with the Bureau in the planning process and assumed responsibility for the actual enumeration. For the 1990 census (as for 1980), the Bureau assigned each area a technical advisor to ensure census procedures and methods were followed during the collection and to assist local officials managing the census.

Since there was minimal residential postal delivery in most of the areas, the data were collected using only the list/enumerate method of enumeration, with no advance delivery by mail. Other differences such as lack of street name/house number address conventions, and so forth, meant implementing many census functions in a different way than they were stateside. This involved modifying stateside forms and procedures or developing new ones.

The DPLD had overall responsibility for planning and coordinating the 1990 censuses in these areas. From July 1984 to August 1987, the Special Programs Branch did this work. In August 1987, the PROAB, under the Assistant Division Chief for Content and Products, was established. Under the branch chief, the Outlying Areas Section (a section chief and two survey statisticians) was the focal point for the various tasks: coordination with other Bureau divisions, DPLD branches, and the Virgin Islands and Pacific Island Territories governments; setting up inter-agency committees; and maintaining direct communication



with area officials at all stages of the census. In consultation with the appropriate subject matter divisions, the section developed questionnaire content, budgets, geographic criteria and field procedures, training guides and forms, education projects, outreach and promotion materials, the processing system, and the tabulation/publication program. Given limited staff, some revisions had to be made to the original time schedules. The FLD's regional offices in Seattle (Pacific Island Territories) and New York (Virgin Islands) dealt with mapping and other geographic matters, with assistance from the GEO as needed.

The 1990 censuses were conducted through memorandums of agreement written by the DPLD with reviews by staffs from the Virgin Islands and the Pacific Island Territories and by the legal staff at the Bureau. As in 1980, these agreements established the general management structure for the DO's, as well as the specific responsibilities of the Bureau and the Virgin Island and Pacific Island Territories governments. The Governor or President of each area and a designated representative (the census coordinator or census manager) were given the responsibility of conducting the field enumeration and related activities. The census coordinator managed and supervised all aspects of the enumeration, including interviewing and testing candidates for jobs, selecting and training qualified persons, and arranging for space, equipment, and supplies. (The government provided training facilities and funding for office space.)

One district office was established in each of the Pacific Island Territories and two in the Virgin Islands—one on St. Thomas, and one on St. Croix. (See table 10 below for DO location and staffing by personnel type).

Table 10. District Office Staffing by Personnel Type

| District office                           | Personnel type |            |             |              |     |     |    |    |
|---|----------------|------------|-------------|--------------|-----|-----|----|----|
|   | All types      | Enumerator | Crew leader | Office clerk | OOS | FOS | CA | CM |
| Total .....                               | 686            | 507        | 94          | 57           | 6   | 11  | 5  | 6  |
| Pago Pago,<br>Am. Samoa .....             | 124            | 92         | 18          | 9            | 1   | 2   | 1  | 1  |
| Malakal, Palau .....                      | 61             | 40         | 7           | 10           | 1   | 1   | 1  | 1  |
| Saipan, CNMI .....                        | 62             | 45         | 7           | 5            | 1   | 2   | 1  | 1  |
| Agana, Guam .....                         | 154            | 103        | 24          | 21           | 1   | 3   | 1  | 1  |
| Charlotte Amalie,<br>St. Thomas, VI ..... | 137            | 111        | 18          | 5            | 1   | 1   | 1  | 1  |
| Christiansted,<br>St. Croix, VI .....     | 147            | 116        | 20          | 7            | 1   | 21  | —  | —  |

The Virgin Islands and Pacific Island Territories DO organizational structure was similar to that in the stateside DO's, but with fewer employees. The organizational structure of the DO in each area included an assistant census coordinator (optional), an office operations supervisor, field operations supervisors, crew leaders, enumerators, and clerks (see fig. 1). DO activities were divided into three major areas: (1) administrative, (2) field operations, and (3) office operations. The administrative area consisted of the census coordinator, the assistant census coordinator, a

support staff to handle administrative correspondence, mail, payroll, and recruiting. The census coordinator had many of the same duties as a stateside district office manager, but reported directly to the Governor (or President, in the case of Palau), not to the Bureau. The Bureau's census advisor acted as its technical representative, working with the coordinator on the various aspects of the census. The advisor trained and administered the oath of confidentiality to the coordinator and his or her assistants, and assisted them in doing this for all other census employees.

To allow for more effective management, the Virgin Islands government funded the position of assistant census coordinator to oversee the daily census operations in the St. Croix office. One census advisor, appointed for the Virgin Islands, worked out of the St. Thomas office but travelled to St. Croix on an as-needed basis. As the Virgin Islands census progressed at a slower-than-expected rate on both St. Thomas and St. Croix, it became increasingly important for the census advisor to be present on both islands to accelerate activities. In late August, the DPLD asked the FLD to detail an employee from the Philadelphia regional office to act as a full-time technical advisor for St. Croix and help bring data-collection activities to a close. This employee assisted operations on St. Croix until late October.

The field operations area consisted of one or more field operations supervisors who prepared crew leader and enumerator field assignments, trained advance listers<sup>14</sup> and crew leaders, supervised enumerator training, and reviewed the field staff's work. The field operations supervisor's administrative duties pertaining to his or her staff were payroll reporting progress and keeping the operations on schedule. Prior to the census, the field operations supervisors' clerical staffs prepared materials for use in the field, which they stored with the maps in a central bin file located in the field operations area. During the actual enumeration, each of these supervisors were responsible for a team of crew leaders who in turn supervised and trained a group of enumerators, appointed them as census employees, and reviewed and collected their completed work and daily pay and work records. The crew leader also enumerated the special places in his or her crew leader district.

The office operations area had one office operations supervisor and a clerical staff that performed several pre-enumeration office operations, but the majority of the work occurred after enumeration once the questionnaires began to flow into the DO. This meant checking-in questionnaires, clerical editing, field followup assignment preparation, and tallying population and housing counts. The work of the office operations supervisor and his or her staff also included setting up the DO by constructing bin files, arranging furniture into sections by type of work, and

<sup>14</sup>The advance lister listed and map spotted the locations of the first six living quarters in two preselected blocks for each ARA assigned to him. During the list/enumerate operation, crew leaders used these completed listings as a check against listings made by enumerators.

controlling materials that arrived in the DO, such as kits and supplies. The office operations supervisor trained and supervised the office operation staff.

Overall, the opening and closing of the DO's occurred from February through December, 1990. The schedule for each outlying area is given below.

| Outlying area | Opening date  | Closing date  |
|---------------|---------------|---------------|
| AmSomoa       | Feb. 1, 1990  | Aug. 30, 1990 |
| CNMI          | Feb. 12, 1990 | Oct. 15, 1990 |
| Guam          | Feb. 22, 1990 | Sep. 27, 1990 |
| Palau         | April 1990    | Aug. 31, 1990 |
| VI            | Mar. 1, 1990  | Dec. 21, 1990 |

## External Communication

In 1986, the Bureau began communicating with the Virgin Islands and Pacific Island Territories governors regarding 1990 census plans and sent each area's congressional delegate informational copies of all letters to keep them abreast of census activities. Also, since publication of 1980 census data for these areas had lagged until 1983-85, a major objective of 1990 census planning was to speed up report production for all the areas to strengthen relationships with local officials data users. As stipulated in the memorandum of agreement with each area, the Bureau consulted with each government concerning questionnaire content, and in 1986, requested each governor to appoint an interagency committee to work with the Bureau on this. There were planning meetings in the Virgin Islands in 1987 and 1988 in American Samoa, the CNMI, and Guam. Staff from various Bureau divisions participated and obtained input from the attendees regarding questionnaire content and overall census plans. Staff from the GEO (in coordination with the FLD) also visited the areas to ensure that the information shown on the 1990 census maps was portrayed accurately. In preparation for the tabulation and publication of the data, the Bureau sent draft table outlines and product specifications to the areas for review.

During the census, the PROAB communicated directly with the Virgin Islands and Pacific Island Territories census advisors and coordinators by fax, notes, and letters on the status of operations. The extreme time differences between headquarters and the CNMI and Guam made telephone communication very difficult during normal office hours. For this reason, the advisors called the PROAB branch chief at home during late hours. In addition to time zone problems, it was generally difficult to get a good telephone connection with the areas at all, especially with Palau. The DPLD purchased fax machines for the PROAB, Virgin Islands, and Pacific Island Territories offices to facilitate communications between headquarters and the areas, and also to solve the time zone problems that made communication by telephone difficult. The advisors faxed their weekly progress, reports questions and concerns that needed timely answers.

The State Department decided which areas would be included in the census. Prior to the 1990 census, the Bureau corresponded with the State Department to keep

abreast of the changing status of the areas that comprised the TTPI— Northern Mariana Islands, Federated States of Micronesia, Marshall Islands, and Palau. The Bureau was concerned particularly about the status of Palau and the possibility of including it in the 1990 census, but this was resolved in time to take the census as of April 1. The Bureau had sent out periodic reports regarding planning, processing, and tabulation/ publication activities. During field operations, the DPLD sent periodic "Outlying Areas Newsletters" to each of the advisors to update them on the overall census progress and activities in the Virgin Islands and the Pacific Island Territories, and allow them to share ideas and "success" stories among the areas.

## Questionnaire Content

Planning for the 1990 censuses of the Virgin Islands and Pacific Island Territories began in 1985, (3 years earlier than it had for 1980). The development of questionnaire content was the responsibility of the Population and Housing Divisions. The Outlying Areas Section of the PROAB of the DPLD served as the coordinating unit between them and the local governments and interagency committees. (In American Samoa and the CNMI, the governments took the agriculture census in conjunction with the population and housing census. The Agriculture Division produced the agriculture questionnaire and other related forms.)

As in 1980, a long-form questionnaire was used for all households. Special questionnaires (ICR's and MCR's—Guam only) were used to enumerate persons in group quarters and on military installations. These forms contained about the same population questions as the household questionnaire, but contained no housing items. The 1990 Virgin Islands and Pacific Island Territories questionnaires were based on the 1980 U.S. census questionnaire, the 1980 censuses of the Virgin Islands and Pacific Island Territories, the 1988 stateside dress rehearsal questionnaire, and current thinking for 1990. Since the Virgin Islands and Pacific Island Territories wanted questionnaires similar to stateside, however, the 1988 dress rehearsal questionnaire was used as the principal basis for determining content. The Virgin Islands and Pacific Island Territories questionnaires also had to comply with the criteria (practical utility and reduction of respondent burden) established by the Paperwork Reduction Act of 1980.

Beginning in 1986, Bureau representatives visited the areas to discuss and obtain recommendations from the local governments and interagency committees on content. The Bureau emphasized the need for documenting the data requirements for Federal or local program participation. The interagency committees included members who could represent the statistical data needs of different segments of the community, such as planning and welfare agencies, law enforcement, health, and education departments, housing authorities, real estate boards, and insurance companies. In developing their recommendations, the committees were asked to weigh the various data needs, taking into account the mandates and program requirements of both Federal and territorial agencies.



An example of a recommendation made by the Virgin Islands Interagency Committee that was rejected by the Bureau involved the inclusion of "cooperative units" in the categories of questions H4 (tenure) and H6 (value of owned unit or rent paid). (The Bureau decided not to have a question on cooperatives on either the Virgin Islands or the stateside questionnaire.)<sup>15</sup> On the other hand, the CNMI's recommendation to add questions on electric power and to modify and/or expand the questions on source of water, source of energy for water heating, vocational training, availability of radios, citizenship, and education were accepted.

As a result of all the modifications, additions, and clarifications, the 1990 population and housing questionnaires used in American Samoa, the CNMI, Guam, and Palau had about 29 basic questions relating to housing characteristics and about 33 basic questions relating to population characteristics. The Virgin Islands population and housing questionnaire had about 26 housing questions and 33 population questions. Some households in American Samoa and the CNMI also had an agriculture questionnaire.

**Virgin Islands**—The interagency committee was concerned about the late issuance of the data products from the 1980 census. Originally, some members also questioned whether the unique (different from stateside) 1980 questionnaire could have resulted in the exclusion of the Virgin Islands from a number of Federal programs. However, Bureau personnel responded that Federal agencies had requested the inclusion of Virgin Islands data from special tabulations for use in their program-allocation formulas program.

In previous meetings held in the Virgin Islands in the summer of 1986, the interagency committee had initially recommended the use of the stateside questionnaire to ensure integration with the stateside statistical system and the timely release of their data. Based on this recommendation, the Bureau proposed a 1990 Virgin Islands questionnaire that could be processed with the already-established stateside software. Bureau staff traveled to the Virgin Islands again in March of 1988 and met with the committee to discuss the questionnaire. The members revised their previous position and proposed a number of changes that made the questionnaire again unique for the Virgin Islands.

<sup>15</sup>The Bureau had tested this question in a variety of formats before the 1980 census and again more recently. The results were consistently shown to be a substantial overstatement of the number of housing units classified as "cooperative." For example, in the 1976 test in Camden, NJ, a city of about 30,000 housing units, the number of cooperative units reported was slightly more than 2,000. Discussions with Camden officials showed that there were no cooperative units in the city. Other tests showed similar although not quite so dramatic results. Overstatements of 150 percent or more were usual. The Bureau concluded that the difficulty was in the term "cooperative" itself. The number of cooperative units was very small. Respondents that lived in cooperatives knew it and reported correctly but most people had never heard the term in the housing context. The term had many more connotations resulting in a large number of false positives.

On review, the Bureau agreed to modify the questionnaire to include most of the recommendations, and transmitted the "final" questionnaire proposal to the Virgin Islands in July 1988. In response to this second proposal, the Virgin Islands committee sent additional changes. The committee's changes were extensive enough that the questionnaire could not be processed using the stateside FOSDIC system without making major changes to the software system, so the Bureau decided to design the Virgin Islands questionnaires as keyable documents. After further review and the incorporation of most recommendations, the Bureau finalized the questionnaire content, and in December 1988, requested concurrence before submitting the form for OMB approval. The Bureau received concurrence in January 1989, and OMB approved the questionnaire in May 1989.

**Pacific Island Territories**—For ease in processing, comparability/availability of data among all areas, and budget, a decision was made early in the questionnaire development program to have a single questionnaire for all of the Pacific Island Territories and process it so as to expedite release of the data products. Later in 1988, after many discussions and meetings with Pacific Island Territories representatives, a compromise was made to design a questionnaire that was basically the same for all areas, but that incorporated some items that reflected unique circumstances. For example, Guam recommended the modification of the questions on citizenship, military service, the availability of radio, and a number of other questions. In American Samoa, the housing-unit definition was modified to reflect the living arrangements among extended families. The CNMI, recommended adding a question on the type, as well as the location (inside or outside), of cooking facilities used at each housing unit.

The content recommendations were reviewed by the POP and the HHES to determine which items merited consideration. Most of the recommendations were accepted. Those not accepted were documented and the rationale for not accepting the comments provided to the areas. The final questionnaire proposals were sent to the governors for their concurrence in February 1989 before submitting the forms to OMB for approval. The Bureau received OMB clearance for the Pacific Island Territories questionnaires in July 1989.

## Procedures

The PROAB adapted the 1990 stateside field and office procedural manuals and forms for the 1990 censuses of the Virgin Islands and Pacific Island Territories, or wrote new ones. Staff members used the 1980 manuals as a reference for obtaining appropriate examples previously tailored to the Virgin Islands and Pacific Island Territories. In cases where corresponding stateside operations were computerized (for example, questionnaire check-in) and where the stateside procedures could not be modified appropriately to the Virgin Islands and Pacific Island Territories because of time and staffing constraints, the PROAB

staff members updated the 1980 Virgin Islands and Pacific Island Territories operations with the help of the subject-matter experts.

There was one principal source of difference between the enumeration plans for stateside and the Virgin Islands and Pacific Island Territories that made modifications necessary. Since postal home deliveries were not as widespread in the Virgin Islands and Pacific Island Territories, the Bureau could not compile an address list for mailout/mailback, so it again adopted a modified list/enumerate procedure, i.e., without advance delivery of the questionnaires.

MCR's were used for all types of military personnel on Guam, including military crews of ships. Since this was the only difference from the stateside procedures and the PROAB staff was faced with time constraints, the staff sent errata sheets listing the modification and did not adapt and retype the entire set of U.S. military manuals. Merchant ships located in the Virgin Islands and Pacific Island Territories on Census Day were enumerated using stateside SCR's. The Bureau sent kits with stateside SCR's directly to shipping companies with American flag merchant vessels (including those companies with American flag vessels located in the Virgin Islands and Pacific Island Territories) for enumerating their crews of ships.

All completed SCR's were mailed to the BAPO. The DPLD made arrangements with the BAPO to sort and send to the DPLD all SCR's filled out by crews of ships located in the Virgin Islands and Pacific Island Territories. The PROAB transcribed the information from the SCR's to the appropriate ICR's (Pacific Islands (PI) or Virgin Islands (VI)) so that the information could be processed with the remaining outlying areas questionnaires. Since the questions on the stateside SCR's were not completely comparable with the questions on the PI/VI ICR's, the DPLD and the Population Division decided what data could be transcribed.

Based on specifications from the International Statistical Programs Center (ISPC), the PROAB assigned the ICR's to dummy group quarters where the ships were docked. After transcription, the PROAB forwarded the PI ICR's to the JFPO and the VI ICR's to the JXPO. Some of the SCR's contained UHE addresses. The SCR's with the UHE addresses in the United States were not transcribed to ICR's and were assumed to have been counted at the UHE addresses in those areas. The information on these SCR's was transcribed to ICR's and sent to the appropriate DO's in Guam and the Virgin Islands for search/match. When a questionnaire or ICR/MCR had a UHE address located in the area covered by the DO, the UHE address was search matched in the DO. After completed questionnaires had been checked-in, clerks completed and geocoded a Search Record, Form D-190 PI, for each WHUHE address. WHUHE questionnaires had the question 1b box marked and an address for the household's "usual home" printed below question 1b.

The geocoded search record went to search/match. The questionnaire for the temporary address was kept in the

office until it closed and then sent for processing to collect the housing data. A UHE address also was identified on an ICR and MCR. However, clerks did not need to complete a search record for ICR's or MCR's that had a UHE address. Office clerks geocoded the UHE address and then conducted search/match; the information for the person was transcribed onto the questionnaire for the UHE address, and the ICR/MCR was set aside to be destroyed with the other Title 13 materials.

A search/match operation had already taken place in the Virgin Islands and Pacific Island Territories DO's. For the Virgin Islands, the initial decision was to geocode the search records (D-190's Outlying Areas) for which the respondent reported a UHE in the Virgin Islands on the questionnaire. These forms were to be geocoded in the DO's to the DO/ARA/block level and the addresses matched in the PO. The STSD and the DPLD later decided that the address/person matching of these forms also would be done in the DO's rather than in the PO, since the DO staff was more familiar with the area and local addressing scheme. The early WYC campaign used ICR's for recording the data for persons claiming they were not counted. These, as well as the WYC forms were included in the search/match operation.

The JXPO sent stateside search records (D-190's Outlying Areas) and WYC forms with a UHE or WHUHE in the Virgin Islands to the St. Thomas DO (St. Thomas sent questionnaires with a St. Croix address to the St. Croix DO) for geocoding and address matching. The DO's shipped Virgin Islands questionnaires containing stateside UHE's and WHUHE's to the PO for search/match processing on a flow basis. The STSD developed situation/action examples of location descriptions for the DO staff because most streets in the Virgin Islands did not have names.

Since many Virgin Islands residents were displaced by Hurricane Hugo, part of the search/match operation was to assign them to "dummy" group quarters at the block level in any ARA where the UHE or WYC address was not found.

Search forms that were transcribed onto enumerator forms were sent to the coding unit and then to the keying unit. Search forms that were matched were sent to the Virgin Islands library.

The Virgin Islands government had a second WYC campaign after the DO's closed, requiring these forms to be geocoded and matched in the PO in order to be processed during search/match. The Jacksonville PO completed most of the processing operations for the Virgin Islands ahead of schedule, partly because its experienced coders had worked earlier on the Puerto Rico processing activities.

## Forms

The DPLD adapted the 1990 stateside public-use forms for use in the Virgin Islands and Pacific Island Territories and, in some cases, updated the 1980 Virgin Islands and Pacific Island Territories forms based on the requirements

of the field operations when the corresponding stateside versions were not applicable. The DPLD added OA (outlying areas) after each form number to indicate use in the Virgin Islands and Pacific Island Territories. In a few cases, the stateside forms were used without adaptation and therefore OA was not added.

Separate OMB clearance was required for certain OA public-use forms—D-31 AS/CNMI and VI/G/P, Privacy Act Notice; D-26 OA, and Census Appointment Record. In some cases, the PROAB made minor modifications to existing stateside forms (already cleared through OMB by the FLD for both stateside and the outlying areas) that did not significantly alter their content or format.

The PROAB calculated the quantities of forms for printing before procedural plans were complete and before finalizing the kit specifications. This resulted in having to reprint some field and/or public-use forms to meet the requirements for additional kits.

After the Virgin Islands enumeration was over, representatives felt that the field counts were too low. Since there were no WYC forms for those islands, the PROAB developed a WYC campaign using the ICR. Later, the Virgin Islands government promoted a second WYC effort using the stateside WYC form. In general, there were more forms and manuals for the 1990 outlying areas censuses than in 1980. For example, advance listing was covered in the crew leaders' manual in 1980, but had a separate manual in 1990. Also, there was no field operations manual in 1980.

## Training

As with the procedural manuals, the PROAB adapted the training guides, workbooks, etc., from the 1990 stateside training materials and incorporated useful examples from the 1980 Virgin Islands and Pacific Island Territories guides. There were verbatim guides to ensure uniform training and to control the cost and time spent on it. Three training guides were chosen for adaptation for the Virgin Islands and Pacific Island Territories; they were the guides for training advance listers, form D-60; crew leaders, D-655; and enumerators, D649.

As in the 1980 census, no formal training materials were developed for the Virgin Islands and Pacific Island Territories field operations supervisor, office operations supervisor, or the census coordinator. The census advisor trained the coordinator using the latter's manual. The coordinator and/or the census advisor trained the field operations supervisor/office operations supervisor using the field and office operations supervisors' manual.

The PROAB held a "dry run" session for enumerator training only. Attendees included the author of the guide, the census advisors, and the census administrator from the Guam Department of Commerce who was helping the PROAB with data collection and outreach procedures. There were no specific guides or job aids developed for training the office clerks. The supervisors gave them on-the-job training using the appropriate chapters in the field and office operations supervisors' manual.

## Personnel Recruiting and Management

With the exception of the census advisors, who were Bureau employees (the advisor to Palau was a retired Bureau employee), all DO recruiting and management were the responsibility of the local government delegated in each area by the Governor or President to the census coordinator. Most other personnel were temporary employees hired by the local government only for the census. These positions included enumerators, crew leaders, office clerks, and supervisory personnel. The office staff was managed by the office operations supervisor, and the crew leaders and enumerators were managed by the field operations supervisor.

The primary recruiting objective was to hire enumerators who lived in the ARA they would be enumerating, but given the low unemployment rate and the inability to hire census workers at the hourly wages offered in some of the Pacific Island Territories, this was not always possible. American Samoa and Palau were the exceptions, since they had larger pools of available workers. To meet recruiting goals, the coordinators and/or their staffs contacted local radio and television stations to advertise census positions. Before they could be hired, all applicants were required to pass a written Bureau test designed to determine whether they could perform census-related tasks. In the CNMI, translators were not tested as a requirement for hiring; the census advisor trained them on the questionnaire itself. In Guam, in an effort to complete the census by September 30, 1990, the local government voluntarily assigned 30 of its regular employees to help take the census.

**Personnel clearance and hiring**—There were no written security-clearance requirements for hiring census workers in the Virgin Islands and Pacific Island Territories. In Palau, however, all known felons identified by the Attorney General were excluded from consideration. All rules and regulations that applied to the local government positions were extended to census jobs. In most of the Virgin Islands and Pacific Island Territories, persons who passed the written test were hired for a census position. The census coordinator, selected for the position by the local governor, was the only one who required clearance, and this was handled by the local government.

**Payroll systems and administration**—As noted previously, all census positions (excluding the Bureau-funded advisor) were paid by the local governments from the funds the Bureau provided under the terms of the memorandum of agreement. The local government decided when to pay the employees, although most were paid every 2 weeks. During the course of the enumeration, the hourly wages were increased in Guam and the Virgin Islands in an effort to fill positions to complete the census. In Guam, the wages for crew leaders and enumerators were increased originally by \$0.50 for crew leaders and enumerators, and a further \$1.00 was subsequently granted. In the Virgin Islands, a \$1.00 bonus per completed questionnaire was

implemented in July; however, it did not have the desired effect and was discontinued. The table below shows the initial and final pay rates.

**Table 11. Hourly Pay Scales**  
(in dollars)

| Item                  | OOS        | FOS        | Crew leader | Enumerator | Clerk      |
|-----------------------|------------|------------|-------------|------------|------------|
| AmSamoa...            | 8.00       | 7.00       | 6.00        | 5.00       | 5.25       |
| CNMI.....             | 9.00       | 8.00       | 7.50        | 6.50       | 6.50       |
| Guam.....             | 8.00       | 7.00       | 6.44/7.94   | 5.46/6.96  | 5.50       |
| Palau.....            | 6.50       | 5.50       | 4.50        | 3.50       | 4.00       |
| VI <sup>1</sup> ..... | 9.00/11.96 | 7.87/10.00 | 7.31/10.28  | 6.19/9.19  | 6.19/ 8.19 |

<sup>1</sup>Included a 12.4-percent cost-of-living allowance (COLA) required by law.

## Information Management

The Virgin Islands and Pacific Island Territories were included in several parts of the computerized decennial census management information system (MIS)—

Support Operations: Outreach and public-use forms/materials

Puerto Rico and Outlying Areas Operations: Data collection and processing,

Pacific Island Territories data products, and for the Virgin Islands, individual activity lines within the Puerto Rico operations for coding, keying, and processing

Tabulation/Publication: Virgin Islands products

The MIS had support and preparatory outlying area activity lines, but there were no cost and progress reports for data-collection operations from the MIS system because the areas were not electronically connected to headquarters. At the beginning of census operations, each census advisor prepared a weekly report that was faxed to headquarters. When this proved unsatisfactory, given the lack of consistency in the type and amount of information provided by each advisor, a report form was designed. The information in the advisors' reports was then combined and summarized with a chart showing field and office operations progress. The chart helped in monitoring the overall progress of operations and was sent to the senior staff in the DPLD. For Pacific Island Territories processing operations, the DPD prepared weekly reports, by area, showing the number of questionnaires checked in, coded, and data-captured. For the Virgin Islands, the DPD entered similar data in the MIS and added cost and progress data for these operations.

## Field Collection

As in 1980, the 1990 censuses of the Virgin Islands and Pacific Island Territories had enumerators visit and list every housing unit, asking questions as worded on the census questionnaire and recording the answers. No sampling was used in the areas. As set forth in the memorandums of agreement, the local governments were responsible for the actual data-collection, but the Bureau bore

most of the incurred costs and also furnished the maps, questionnaires, instructions, training materials, office supplies, and the funds to lease vehicles and office equipment.

A low unemployment rate in Guam and the Virgin Islands made it difficult to recruit enough workers and resulted in a part-time workforce at best. These staffing problems extended data-collection activities significantly in those two areas. The DPLD worked closely with the census coordinator and advisor in the Virgin Islands to expedite data collection.

To compensate for a small workforce, the census advisors in Guam, the CNMI, and Virgin Islands requested and received approval to conduct a telephone followup operation to obtain information that was missing from the questionnaires. Original procedures had excluded this as an option because of recommendations made by previous Virgin Islands and Pacific Island Territories advisors. Contrary to the findings in past censuses, however, the advisors in Guam, the CNMI, and the Virgin Islands now found the telephones were prevalent in their areas and telephone followup proved to be a successful tool for resolving a majority of the followup cases. Followup enumerators, however, still had to return to the field to obtain the missing information from those households that could not be reached by telephone.

Before field followup (FFU) began (in American Samoa and the CNMI only), all population and housing questionnaires and all agriculture questionnaires passed a clerical edit. Clerks separated the questionnaires into work units within an ARA, performed all edit operations for one work unit at a time, and recorded the results on Form D-403 Outlying Areas, Record of Questionnaire Clerical Edit. The edit operation went through a QA plan where clerks verified a sample of edited questionnaires and corrected any errors detected. Then the questionnaires went through a FFU to repair ARA's that had missing persons or housing units, or had failed-edit questionnaires.

The crew leader gave the enumerator the questionnaires that needed followup action. Housing units not listed on the address listing page were added to it. The enumerator completed a questionnaire for units found to be occupied by the same household as of Census Day. For units occupied by a different household, the enumerator got "last resort" information for the Census Day occupants and all the housing unit information, but did not complete any population questions for the new occupants.

The enumerator completed a questionnaire for units vacant on Census Day, regardless of the present status. For nonexistent units or units not meeting the housing-unit criteria, the enumerator deleted the address from the address listing page. For more than one unit at the address, the enumerator added any unlisted units to the address listing page, reviewed the ARA to make sure they were not listed elsewhere and completed a questionnaire. After the FFU, the enumerator returned the census questionnaires, D-376 Outlying Areas, address register, and D-320 Outlying Areas, refusal record, (if any) to the crew leader for review.

**Special places**—The DPLD obtained lists of special places from each area government in advance of the census, since there were no plans to prelist them (as in the states) in the Virgin Islands and Pacific Island Territories. Enumerators used these lists as the basis for the special place (SP) enumeration. In the case of the CNMI, the government did not have comprehensive lists of all worker's barracks, and some were not easily identifiable.

The procedures specified that the SP enumeration be completed prior to the regular enumeration, but unexpected increases in the number of group quarters since 1980 and limited staff prevented this. Most areas completed it about the same time they finished the regular enumeration. An SP operation concurrent with the regular one presented problems in ARA's that contained special places because there was only one address register, and both the SP and regular enumerators needed to work from the same registers. In the Virgin Islands, SP enumerators used mockup address registers, which later had to be transcribed to the original ones. In the other outlying areas, the SP enumerators either coordinated their work with the regular enumerators or waited until the regular enumeration was completed.

Special 1990 census field procedures were implemented both in counting households and processing the data in the Virgin Islands and American Samoa areas affected by Hurricane Hugo and Hurricane Ofa, respectively. Significant numbers of households were displaced from their usual place of residence ("usual place of residence" described where the Bureau would normally count and geographically list people and households in the census). Specifically, any of these households which reported a destroyed or damaged residence location as their usual residence were shown as living at that location rather than where they were living temporarily. The census questionnaire asked whether the household usually lived somewhere else. Answers to that question were used to count the household at its "normal" area or place of residence. It was important that a household affected by the hurricane report its usual place of residence on the census form. Some affected households doubled up with others, or for some reason did not receive a visit from a census enumerator. In these cases, the household was to ask for assistance to the census office in their area or inform the enumerators, during their visit, that other persons were temporarily staying with the household because of the hurricane.

In the CNMI, the number of group quarters (mainly barracks at hotels, garment factories, and construction sites) was greater than expected. Besides the obvious problems of enumerating so many persons, language barriers existed because most special places were foreign owned/managed. This also made it difficult to communicate to the managers the need to enumerate the persons in the barracks. In SP's where there were no English-speaking workers, the enumeration was done on a one-to-one interview basis between the respondent and an appropriate translator specifically trained to enumerate barracks, about 10 to 30 minutes per ICR.

The crew leaders reviewed each questionnaire and ICR turned in by the enumerators. Crew leaders were required to certify that each questionnaire was complete and contained at least the minimum required information. They also ensured that there was an agriculture questionnaire (in the CNMI and American Samoa only) if the listing in the address register indicated that one or more was collected. When the work in an ARA was finished, crew leaders placed all completed forms in a transmittal envelope and labeled it with the enumerator's name, ID code, and the ARA number. Clerks checked the questionnaires and ICR's for crew leader initials, the date, and crew leader district number, certification on each of the D-2A turned in, and that the crew leader entered "ICR with the address—ready for processing" on each ICR turned in. ICR's that had been copied to a questionnaire were placed in an envelope marked "Confidential materials—to be destroyed." Once the DO clerks checked in the work, they revised the address register counts based on their findings, using a purple-lead pencil to make all changes to the address register. The office operations supervisor then collected the address registers and maps for the bin files.

As soon as all other office operations were completed and the population and housing counts accepted, the packing operation began. The office operations supervisor assigned the packing of the questionnaires along with any ICR's, MCR's, and special place or group-quarter materials to the clerks, one ARA at a time. The address registers, maps, and other miscellaneous materials were packed and shipped to a designated processing office (see below). In American Samoa and the Northern Mariana Islands, the agriculture questionnaires also were packed separately. Assigned clerks verified that the packaging was done correctly.

## Processing

In 1980, the Bureau had used the FOSDIC system to capture the data from the Virgin Islands and Pacific Island Territories questionnaires, which were FOSDIC-readable. As those forms differed from the stateside ones, the latter—with their deadlines for producing apportionment and redistricting data—had been processed first. Then FOSDIC had to be reprogrammed for Puerto Rico and yet again for the outlying areas. This meant that their publications also appeared last.

For 1990, the decision was made to use non-FOSDIC forms for these areas, and key the data instead outside the FACT 90 processing system for the Mainland.<sup>16</sup> Doing this would allow for differences in questionnaire form and content immediately, and the data could move in a direct,

<sup>16</sup>This system, called FACT 90 (FACT stood for "film and automated camera technology"—see ch. 8), used both FOSDIC and keying. A keyer automatically coded from data bases such written-in entries as income, occupation and industry, and so forth directly to the household record on the computer tape, but could intervene manually as necessary. In the past, all of these entries had to be clerically looked up and coded before microfilming.



time-saving line to the published products. Early in the planning stages for the 1990 Virgin Islands and Pacific Island Territories censuses, the DPLD evaluated several alternative systems to do this. It proposed to the governments the Integrated Microcomputer System (IMPS), a product of the Bureau's International Statistical Programs Center (ISPC). IMPS consisted of software modules for entering, editing, tabulating, analyzing, and managing census and survey data on personal computers.

In meetings in 1986, the Virgin Islands government and its interagency committee emphasized that they wanted their 1990 census to be fully integrated with the stateside process, and the Bureau agreed. Even though the Virgin Islands questionnaires were not FOSDIC-readable, they still were keyed on the FACT 90 system and the records then were put through the processing, tabulation, and publication systems into which FACT 90 led. The Pacific Island Territories, on the other hand, agreed with the Bureau's proposal to use IMPS. This decision freed the Pacific Island Territories from competition with the States for processing and tabulation. As a result, data for the Pacific Island Territories were released much earlier than for the Virgin Islands.

**Methods and procedures**—Each of the Virgin Islands and Pacific Island Territories DO's sent their questionnaires and registers stateside to the PO's; the 70,000 Pacific Island Territories questionnaires (including ICR's) went to Jeffersonville, IN, and the 40,000 Virgin Islands forms to Jacksonville, FL. Unlike the stateside questionnaires, those from the Virgin Islands and Pacific Island Territories could not be automatically coded because responses to the items that required coding were different from the corresponding stateside data base of responses and there were not sufficient time and resources to build a separate one.

**Pacific Island Territories**—After data capture, the Jeffersonville PO sent the data files on tape to the ISPC, which utilized the IMPS software to perform edits, disclosure avoidance, tabulations, and a variety of other operations. The Pacific Island Territories data files structure edits to determine the questionnaires' completeness. Using a consistency and correction (CONCOR) program, the edit subsystem of IMPS subjected the data to essentially the same edits as the stateside sample questionnaires. To ensure disclosure avoidance, it systematically blanked data items in a selected portion of the fields and then imputed the items using a set of CONCOR edit programs. The final edited data file contained imputations due both to invalid responses in the questionnaire as well as responses blanked for disclosure avoidance.

The tabulations were produced using the census tabulation system (CENTS) segment of IMPS. Bureau specialists verified the tabulations using frequencies and cross tabulations produced from the IMPS quick tabulation (QUICK-TAB) system. Once the tables had been approved, the ISPC produced a special data file in a format that the Table Image Processing System (TIPS) II could merge into the publication table outlines (see ch. 10).

**Virgin Islands**—The DOD was responsible for processing the Virgin Islands questionnaires at the JXPO. The POP and the HHES provided the specifications for editing incorrect or inconsistent data and for the clerical coding training. Processing of both the Pacific Island Territories and Virgin Islands questionnaires took place concurrently with the late stateside operations (search/match, PES, and sample write-in keying). This approach addressed the local governments' concern for improving the timeliness of census data products.

**Workflow**—Virgin Islands and Pacific Island Territories DO's batched the questionnaires by ARA before sending them to the processing offices. At the PO's, the questionnaires were checked in, coded, keyed, and verified. The quality of the coding operations was controlled/estimated using a manual three-way independent verification scheme on a sample of questionnaires from each work unit. The quality of the keying operation depended on a quasi-independent verification process. A sample of questionnaires within each work unit was verified with all detected errors being corrected. The Pacific Island Territories computer files were then sent to the ISPC for editing and tabulation while the Virgin Islands data files were handled by the DOD system.

The PO's checked for still-missing questionnaires by matching incoming ones to the address registers. When a questionnaire was missing, the PO created one to reflect the population count from the address register. The write-in entries for the Virgin Islands and Pacific Island Territories questionnaires required general, place-of-birth, migration, place-of-work, and industry and occupation coding.

## Data Product Development and Dissemination

**Background**—As previously noted, planning the 1990 data products for the Virgin Islands and Pacific Island Territories began early in the decade. After reviewing recommendations from each area, a final census product program was designed and sent to the respective governments in December 1987.

**Products**—Based on the Virgin Islands interagency committee's recommendation, the 1990 Virgin Islands data products were like those produced for the States, but with modifications because of differences in the geographic entities and questionnaire content. The Pacific Island Territories data products were tailored to meet the areas' program needs. Following recommendations from the areas, each Pacific Island Territories's data appeared in a separate report. Initially, the plan was to replicate in the STF's the same tables included in the printed reports, but to present the geography down to the block level. Ultimately, a decision was made to use the stateside approach for the STF's: The staff wrote specifications for two STF's (STF 1 and 3) for each area, with more geographic and content detail than was possible to include in the printed report.

Throughout the development of the tabulation and publication program, each of the outlying areas was given the opportunity to comment on table specifications before they were finalized. Standard data products were in the form of printed reports, STF's, CD-ROM's and diskettes (based on requests from the outlying area representatives). Also, the HHES published a series of profiles for each of the outlying areas entitled Housing Highlights. These profiles examined housing data from the 1980 and 1990 censuses of housing.

### *Virgin Islands*

#### **Printed reports:**

| Series   | Title  |
|----------|--|
| CPH-1-55 | Summary of Population and Housing Characteristics                |
| CPH-2-55 | Population and Housing Unit Counts                               |
| CPH-3-55 | Population and Housing Characteristics for Block Numbering Areas |
| CPH-5-55 | Summary Social, Economic, and Housing Characteristics            |
| CP-1-55  | General Population Characteristics                               |
| CP-2-55  | Social and Economic Characteristics                              |
| CH-1-55  | General Housing Characteristics                                  |
| CH-2-55  | Detailed Housing Characteristics                                 |

A special supplementary report, *Detailed Population and Housing Characteristics*, was recommended by the Virgin Islands government and the interagency committee and was released as CPH-L-156 in August 1994. This report provided a series of cross-tabulations of detailed population and housing data. (The Bureau's User-Defined Areas Program (UDAP) offered for-fee population and housing data to participants for their specified Virgin Islands areas. Data users whose needs could not be met by this or other standard products also could order special tabulations.)

#### **Summary tape files:**

STF 1A and 1B (100-percent stateside equivalent data)  
 STF 2 (100-percent stateside equivalent data)  
 STF 3 (stateside sample equivalent data)  
 STF 4 (stateside sample equivalent data)  
 Public-use microdata sample (PUMS) (10 percent)

#### **Products available on CD-ROM for the Virgin Islands:**

Population and housing characteristics from STF 1A  
 Population and housing characteristics for blocks from STF 1B  
 Social, economic, and housing characteristics from STF 3

#### **Maps:**

Caribbean locator map  
 County block maps

County subdivision outline map (page-size sectionalized and poster-size)  
 Census tract/block numbering area outline maps  
 State and county outline map

### *Pacific Islands*

#### **Printed reports:**

1990 CPH-6 Social, Economic, and Housing Characteristics  
 This report includes both 100-percent and sample state-side equivalent data. There was one report for each Pacific Island Territories.

#### **Summary tape files:**

STF 1 (100-percent stateside equivalent data)  
 STF 3 (stateside sample equivalent data)  
 PUMS (Guam only — 10 percent)  
 The STF's and PUMS file also were available on flexible diskettes

#### **Maps:**

Pacific locator map  
 County block maps  
 County subdivision outline maps (page-size sectionalized and poster-size)  
 Census tract/block numbering area outline maps  
 State and county outline map

### **Dissemination of Products**

After the 1980 census, the Bureau and the Virgin Islands negotiated an agreement to establish a data center at the University of the Virgin Islands as part of the DUSD's State Data Center Program (see ch. 10). Although American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam also expressed interest in the data center program, only Guam signed an agreement with the Bureau and established the Guam Territorial Data Center in February 1988. It was expected that the data centers would be the main vehicles for the dissemination of the 1990 data products in these areas.

The DPLD had a mailing list of outlying area governors, area representatives in Washington, and Interagency Committee members and sent them complimentary copies of the printed reports, STF's, and maps. As for stateside, the DUSD priced and sold the computer products and maps for the outlying areas; and the Government Printing Office did the same for the printed reports.

### **Outreach, Advertising, and Public Relations**

The recommendations from the outlying areas interagency committees (Guam, American Samoa, the CNMI, Palau) called for the preparation of a separate promotional campaign for each of the outlying areas. Based on this input, the original overviews for outreach in the outlying areas called for the 1990 Census Promotion Office (CPO)



to tailor a comprehensive outreach campaign to fit the islands' unique ethnic, socioeconomic, and geographic requirements. All production work was to be completed in time to distribute the materials in early 1990.

In actuality, the Virgin Islands campaign was piggy-backed onto the work that was done for Puerto Rico when it appeared that nothing would be produced in time to promote the census. In the Virgin Islands, most materials were received by mid-March. The Pacific Island Territories outreach campaign was an offshoot of the stateside products, with changes in content that reflected procedural differences between the States and the Pacific Island Territories. To help speed up the late development of these products, the area liaisons or their Washington representatives provided translation services. In the Pacific Island Territories, finished materials were not received until the second or third week in March, with some arriving at the end of the month, just before Census Day (April 1).

## Education Projects

The PROAB designed separate education kits for American Samoa, the CNMI, Guam, and the Virgin Islands, but not for Palau because the possibility of this area attaining its independence made it uncertain, until late 1989, whether the Bureau would take a census there. The DPLD's education project for the States was the basis for all the kits. Exercises were modified to account for differences in the terminology, living conditions, and geography of each outlying area. The kits were sent in draft form to the interagency committees for their review. All kits were shipped to the census coordinators beginning with those for the Virgin Islands (December 1989) and ending with the kits for the CNMI (March 1990). A PROAB staff member went to the Virgin Islands and met with a member of the Department of Education and teachers from St. Croix and St. Thomas who were using the materials to obtain their reactions to the education kits provided to them. The responses were very positive.

Table 12. Promotional Products Distributed

| Virgin Islands  | Pacific Outlying Areas   | Virgin Islands and Pacific Outlying Areas  |
|---|--|--|
| <p><i>Brochures</i></p> <ul style="list-style-type: none"> <li>● Why Should the People of the Virgin Islands Answer the Census?—Form D-3214 VI (English/Spanish)</li> <li>● Open Your Doors to a Better Future (3" x 6")</li> <li>● Open Your Doors to a Better Future (5" x 9")</li> </ul> | <p><i>Brochure</i></p> <ul style="list-style-type: none"> <li>● Why should the People of (Guam, Palau, CNMI, American Samoa) Answer the Census?—Form D-3214 (G, P, CNMI, AS). Produced in languages appropriate to each individual area</li> </ul> | <p><i>Reproduction art</i></p> <ul style="list-style-type: none"> <li>● Copies of camera ready art work that were from the Communicator's Kit prepared for the States</li> </ul>   |
| <p><i>Poster</i></p> <ul style="list-style-type: none"> <li>● Answer the Census—Form D-3239 VI (English/Spanish)</li> </ul>   | <p><i>Poster</i></p> <ul style="list-style-type: none"> <li>● Answer the 1990 Census—Form D-3239</li> </ul>  | <p><i>Novelty items**</i></p> <ul style="list-style-type: none"> <li>● Coffee mugs</li> <li>● Pencils</li> <li>● T-Shirts</li> <li>● Bumper stickers</li> <li>● Buttons</li> <li>● Baseball caps</li> </ul>  |
| <p><i>Public service announcements *</i></p> <ul style="list-style-type: none"> <li>● The Complete Count</li> <li>● It Counts for All of Us</li> <li>● The People Reel</li> <li>● Variety Video</li> <li>● Ao del Censo</li> </ul>  |  | <p><i>Press releases/newspaper articles</i></p> <p>Press releases announcing special procedures developed to deal with the problems of enumerating residents affected by the hurricanes that hit American Samoa and the VI.</p> <p>The census coordinators and advisors briefed the press and gave interviews for newspaper articles, TV, and radio spots.</p> |

\* Only the Virgin Islands received copies of the public service announcements. The CPO staff member overseeing the Virgin Islands promotion campaign was familiar with what was prepared for the States and arranged to have copies of original stateside tapes shipped to the Virgin Islands. The television stations in the Virgin Islands edited the tapes for use there.

\*\* Both the Virgin Islands and Pacific Island Territories received the same novelty items produced for the States. The artwork and wording were modified to reflect procedural differences for the areas.

## APPENDIX 13A.

### Training and Instructor's Kits Prepared for Puerto Rico, 1990 Census

| Kit number   | Description  | Quantity |
|--------------|--|----------|
| 611 PR       | Instructor—Reinterview Crew Leader                             | 20       |
| 611A PR      | Trainee—Reinterview Crew Leader                                | 100      |
| 617 PR       | Instructor—Testing and Selecting Clerk                         | 100      |
| 617A PR      | Trainee—Testing and Selecting Clerk                            | 200      |
| 630(L/E)     | PR Instructor—List/Enumerate Field Operations Supervisor       | 75       |
| 630(L/E)A PR | Trainee—List/Enumerate Field Operations Supervisor             | 200      |
| 632(A) PR    | Instructor—Edit Clerk  | 150      |
| 632(A)A PR   | Trainee—Edit Clerk   | 700      |
| 632(B) PR    | Instructor—Telephone Followup Clerk                            | 75       |
| 632(B)A PR   | Trainee—Telephone Followup Clerk                               | 300      |
| 632(D) PR    | Instructor—Edit QA Clerk                                       | 75       |
| 632(D)A PR   | Trainee—Edit QA Clerk  | 200      |
| 649 PR       | Instructor—List/Enumerate Enumerator                           | 1,300    |
| 649A PR      | Trainee—List/Enumerate Enumerator                              | 9,000    |
| 651 PR       | Instructor—Field Followup (List/Enumerate) Enumerator          | 300      |
| 651A PR      | Trainee—Field Followup (List/Enumerate) Enumerator             | 1,700    |
| 652 PR       | Instructor—Field Followup (List/Enumerate) Crew Leader         | 100      |
| 652A PR      | Trainee—Field Followup Crew Leader                             | 300      |
| 655 PR       | Instructor—List/Enumerate Crew Leader                          | 150      |
| 655A PR      | Trainee—List/Enumerate Crew Leader                             | 1,300    |
| 656 PR       | Instructor—Reinterview Enumerator                              | 100      |
| 656A PR      | Trainee—Reinterview Enumerator                                 | 450      |
| 658 PR       | Instructor—Reinterview Crew Leader Assistant                   | 100      |
| 658A PR      | Trainee—Reinterview Crew Leader Assistant                      | 200      |
| 660 PR       | Instructor—Advance Listing (List/Enumerate) Enumerator         | 150      |
| 660A PR      | Trainee—Advance Listing (List/Enumerate) Enumerator            | 700      |
| 664(L) PR    | Instructor—Postcensus Local Review (List/Enumerate) Enumerator | 50       |
| 664(L)A PR   | Trainee—Postcensus Local Review (List/Enumerate) Enumerator    | 200      |
| 665(A) PR    | Instructor—Special Place (Early Operations) Supervisor         | 30       |
| 665(A)A PR   | Trainee—Special Place (Early Operations) Supervisor            | 100      |
| 665(B) PR    | Instructor—Special Place (Late Operations) Supervisor          | 30       |
| 665(B)A PR   | Trainee—Special Place (Late Operations) Supervisor             | 100      |
| 668 PR       | Instructor—Special Place Prelist Enumerator                    | 50       |
| 668A PR      | Trainee—Special Place Prelist Enumerator                       | 100      |
| 669 PR       | Instructor—Group Quarters Enumeration Enumerator               | 50       |
| 669A PR      | Trainee—Group Quarters Enumeration Enumerator                  | 200      |
| 670 PR       | Instructor—Special Place Prelist Crew leader                   | 50       |
| 670A PR      | Trainee—Special Place Prelist Crew Leader                      | 50       |
| 671(P1) PR   | Instructor—S-Night Enumerator                                  | 50       |
| 671(P1)A PR  | Trainee—S-Night Enumerator                                     | 300      |
| 671(P2) PR   | Instructor—S-Night Enumerator                                  | 50       |
| 671(P2)A PR  | Trainee—S-Night Enumerator                                     | 300      |
| 672 PR       | Instructor—Group Quarters Enumeration Crew Leader              | 50       |
| 672A PR      | Trainee—Group Quarters Enumeration Crew Leader                 | 100      |

## APPENDIX 13B.

### Supply Kits Assembled and Shipped to Puerto Rico During the 1990 Census

| Kit number | Description  | Quantity |
|------------|--|----------|
| 301 PR     | General Office Supplies  | 9        |
| 302 PR     | Furniture and Equipment  | 9        |
| 303 PR     | Envelopes, Labels, and Stationery                                    | 9        |
| 304 PR     | Administrative Forms   | 9        |
| 305 PR     | D-Series Forms   | 9        |
| 307A PR    | Manuals for Office Use and Extras                                    | 9        |
| 307B PR    | Manuals for Office Use and Extras                                    | 9        |
| 308A PR    | Guides for Training and Self Studies                                 | 9        |
| 308B PR    | Guides for Training and Self Studies                                 | 9        |
| 309 PR     | EDP Supplies   | 10       |
| 310 PR     | EDP Forms and Manuals  | 10       |
| 517 PR     | Testing and Selecting Supplies for District Offices                  | 9        |
| 549 PR     | List/Enumerate—Enumerator Supply                                     | 9,000    |
| 551 PR     | Field Followup (LE)—Enumerator Supply                                | 1,700    |
| 552 PR     | Field Followup (LE)—Crew Leader Supply                               | 300      |
| 555 PR     | List/Enumerate—Crew Leader Supply                                    | 1,300    |
| 558 PR     | Reinterview—Crew Leader Assistant Supply                             | 150      |
| 568 PR     | Special Place Prelist—Enumerator Supply                              | 100      |
| 569 PR     | Group Quarters Enumeration—Enumerator Supply                         | 200      |
| 570 PR     | Special Place Prelist—Crew Leader Supply                             | 100      |
| 572 PR     | Group Quarters Enumeration—Crew Leader Supply                        | 100      |
| 575 PR     | Military Installations Self-Enumeration—Census Representative Supply | 100      |
| 577 PR     | Self-Enumerating Places—Crew Leader Supply                           | 100      |

## APPENDIX 13C.

### 1990 Census Public-Use Forms—Puerto Rico

| Form number     | Form title   | Quantity  |
|-----------------|--|-----------|
| D-1 PR (S)      | Short-form questionnaire (Spanish)                         | 1,100,000 |
| D-1A PR (E)     | Short-form enumerator—administered questionnaire (English) | 350,000   |
| D-1A PR (S)     | Short-form enumerator—administered questionnaire (Spanish) | 1,500,000 |
| D-2A PR (E)     | Long-form enumerator—administered questionnaire (English)  | 250,000   |
| D-2A PR (S)     | Long-form enumerator—administered questionnaire (Spanish)  | 750,000   |
| D-3PR (S)       | Short-form instruction guide                               | 1,100,000 |
| D-6 (BR) PR     | Short-form outgoing envelope                               | 1,100,000 |
| D-14 PR (S)     | Motivational Insert  | 1,100,000 |
| D-20 A PR (E)   | Individual Census Report—short form (English)              | 250,000   |
| D-20A PR (S)    | Individual Census Report—short form (Spanish)              | 500,000   |
| D-20B PR (E)    | Individual Census Report—long form (English)               | 75,000    |
| D-20B PR (S)    | Individual Census Report—long form (Spanish)               | 250,000   |
| D-21 PR (S)     | Military Census Report (Spanish)                           | 25,000    |
| D-22 PR         | Special place poster                                       | 50,000    |
| D-23 PR         | Shipboard Census Report                                    | 25,000    |
| D-25 PR (E)     | Were You Counted? (English)                                | 3,000     |
| D-25 PR (S)     | Were You Counted? (Spanish)                                | 10,000    |
| D-26 PR (E)     | Census appointment record (English)                        | 50,000    |
| D-26 PR (S)     | Census appointment record (Spanish)                        | 800,000   |
| D-27 PR         | Introduction to English-speaking households                | 75,000    |
| D-30 (L) PR (E) | Special place advance notice letter (English)              | 3,000     |
| D-30 (L) PR (S) | Special place advance notice letter (Spanish)              | 50,000    |
| D-31 PR         | Privacy Act notice   | 2000,000  |
| D-33 (L) PR (S) | Letter—S-Night locations (Spanish)                         | 400       |
| D-40 PR (E)     | Envelope—Individual Census Report (English)                | 250,000   |
| D-40 PR (S)     | Envelope—Individual Census Report (Spanish)                | 1,100,000 |
| D-70 PR (S)     | Local Review information booklet                           | 400       |
| D-70 (L) PR (E) | Local Review information letter                            | 400       |
| D-73 PR (S)     | Local Review technical guide                               | 50,000    |
| D-561 PR        | Questionnaire reference book                               | 2,900     |
| D-806 PR        | Reinterview and reconciliation questionnaire               | 175,000   |

# APPENDIX 13D. Geographic Concepts

## INTRODUCTION

The geographic components of the censuses within the United States and in Puerto Rico and the Outlying Areas varied, based on each entity's history, governmental and administrative structure, and the pattern of population settlement. The Census Bureau presented data for the geographic components in terms of a standard, consistent framework—often this was in a geographic hierarchy. The data for some components also appeared in an inventory listing, which included all places within a "state" or a statistical equivalent of a state (the Commonwealth of Puerto Rico, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Republic of Palau or the Virgin Islands of the United States); all census tracts or block numbering areas were listed within a "county." The high-level geography for each entity is listed in figure 1 (Puerto Rico) and figure 5 (Virgin Islands and Pacific Outlying Areas) and explained later.

## CENSUS GEOGRAPHIC UNITS IN PUERTO RICO

The Bureau's U.S. geographic hierarchy generally descended from the State level to county, county subdivision (minor civil division [MCD] and census county division [CCD]), place (incorporated and census designated), census tract or block numbering area (BNA), and block group (BG) and census block. In Puerto Rico, the hierarchy was similar, but there were language differences and the presence of a geographic entity—the subbarrio—that did not correspond to any mainland geographic entity. The highest level was the Commonwealth, the statistical equivalent of a State for census purposes; the next level comprised the municipio, then the barrio and barrio-pueblo, subbarrio, zona urbana and comunidad, census tract and BNA, BG, and block. The island's landscape was divided into both legally-defined and statistical geographic units. Figure 1 compares the census geographic areas in Puerto Rico with those of the States. Puerto Rico's legally-defined geography was the result of historical factors and legal actions taken by the Commonwealth Legislative Assembly, while statistical geography was the result, in most cases, of the interaction of geographic and planning staffs in the Bureau and the Puerto Rico Planning Board (PRPB). The PRPB delineated census statistical areas according to established Bureau guidelines, worked with the municipio governments as appropriate, and verified the legally-defined boundaries used in the census (Junta de Planificacin, 1985).

Figure 1. Comparison of Census Geographic Areas in Puerto Rico and the States

| Puerto Rico                       | States                            |
|-----------------------------------|-----------------------------------|
| Commonwealth                      | State                             |
| municipio                         | county                            |
| barrio/barrio-pueblo              | county subdivision (MCD/CCD)      |
| subbarrio                         | no comparable area (sub-MCD)      |
| no comparable area                | incorporated place                |
| zona urbana/comunidad             | census designated place           |
| census tract/block numbering area | census tract/block numbering area |
| block group/block                 | block group/block                 |

## Legally-defined Units in Puerto Rico

The legally-defined units in Puerto Rico included both the municipio, which performed governmental functions, and the barrio/barrio(s)-pueblo, which were administrative units of the municipio. These entities underwent changes since their origins in 400 years of Spanish rule. While the municipio system of government predated the acquisition of Puerto Rico in 1898 by the United States, the Foraker Act of 1900 placed the functional existence of the municipio under the authority of the Legislative Assembly. The legal basis for Puerto Rico's current municipio and barrio structure derived from a 1945 statute passed by the Legislative Assembly authorizing the establishment of legal written descriptions and maps for each of the municipios and their constituent barrios. These legal documents, one for each municipio and its constituent barrios, were called memorias and were published between 1946 and 1955. Final boundaries were sent to the U. S. Geological Survey (USGS) for insertion on the first set of topographic quadrangle maps for Puerto Rico.

Approval and funding by the Legislative Assembly of this massive project to legally define all political/administrative boundaries were based on a number of planning and development issues that arose at the end of the Second World War. The primary reasons for implementing this project were stated generally in each of the municipio memorias: to assist legislative actions, to support research on the general welfare of the population, to facilitate the work of the U.S. Bureau of the Census, to assist the registration and measurement of properties, and to serve as the basis for an islandwide cadastral map. The memorias used a number of terms interchangeably, a factor that probably contributed to later confusion relating to the origin and meaning of several terms used for geographic entities

in census tabulations. For instance, the terms *zona urbana* and *barrio-pueblo* were used interchangeably in many of the *municipios*, as were the terms *barrio urbano*, *pueblo*, *ciudad*, and *zona urbana* for some of the more urban *municipios*. Also, the term *subbarrio* was not used consistently.

Figure 2. Hierarchy of Legal/Administrative Units in Puerto Rico

|                   |   |
|-------------------|---|
| Commonwealth      | (State equivalent)                            |
| municipio         | (county equivalent)                           |
| barrio            | (minor civil division)                        |
| barrio-pueblo     |   |
| subbarrio         | (no stateside equivalent for the 1990 census) |
| election district | (election or voting district)                 |

### Commonwealth

For all census programs, the Commonwealth (*Estado Libre Asociado*) of Puerto Rico was treated as the statistical equivalent of a State.

### Municipio (County, County Subdivision, and Place Equivalent)

For census purposes, the *municipio* was a county equivalent; that is, the Bureau treated it as the statistical equivalent of a stateside county. For 1990, there were 78 *municipios* of varying size and population on a land surface of approximately 3,427 square miles. The *municipio*, represented by an elected mayor and a *municipio* assembly, was the primary legal subdivision of the Commonwealth and the only sub-commonwealth entity with a functioning government. While the Commonwealth government performed most major public works and services such as public safety, sewer and water, health and land use planning and zoning, the *municipio* carried out, but often shared with the Commonwealth, more limited functions such as road maintenance, sanitation, and recreation. Although the Bureau had reported data for Puerto Rico by *municipio* since its inclusion in the decennial census (1910), the boundaries for these geographic areas did not become legal until 1947, following an extensive review by the PRPB. Once the legal boundaries were in place, only an act of the Commonwealth legislature could create or adjust *municipio* boundaries. Since 1947, there had been three such changes: (1) in 1951, San Juan *municipio* annexed Rio Piedras *municipio*; (2) in 1971, Florida *municipio* was established from part of the Barceloneta *municipio*, and (3) in 1973, Canovanas *municipio* was established from part of Loiza *municipio*.

### Barrio (Minor Civil Division Equivalent)

For census purposes, *barrio* and *barrio-pueblo* (see following sections) were MCD's. Although they had defined legally established boundaries, these entities were not functioning governmental units. For the 1980 census, the Bureau recognized *ciudades*, *pueblos*, and *barrios* as MCD equivalents. For 1990, the use of the *ciudad* was dropped and the name *pueblo* was changed to *barrio-pueblo*. These terms will be discussed more fully in the following sections.

Figure 3. Changes in Terminology (Cambios de Terminologia)

| 1980 Census<br>(Censo de 1980) | 1990 Census<br>(Censo de 1990) |
|--------------------------------|--------------------------------|
| Ciudad                         | Eliminated (eliminado)         |
| Pueblo                         | Barrio-pueblo                  |
| Barrio                         | Barrio                         |

There were 899 *barrios*, including 75 *barrios-pueblo*, which were the primary legal subdivisions of *municipios*. *Barrios* and *subbarrios* were legally established as permanent political and statistical entities. *Barrios* were used as areas for which members of both the Puerto Rico legislature and the *municipio* assemblies were elected. However, *barrios* did not have elected officials; the Commonwealth and *municipio* governments provided all basic services and made all legal decisions. Unlike the case of *municipio* boundaries, none of the traditional *barrio* boundaries of any *municipio* were ever legally amended. (The annexation or separation of *municipios* since 1951 did not affect the integrity of the *barrio* boundaries; they were simply retained in their same location.) Each *municipio* could legally amend the limits of its *barrios* as long as these changes were communicated to the Puerto Rico Planning Board.

### Barrio-Pueblo

In the 1990 census, the term *barrio-pueblo* replaced the term *pueblo* used in previous censuses. Consistent with the legal name used in the *memorias*, this term reinforced the fact that what was called the *pueblo* for previous censuses was, like all other *barrios*, a legal subdivision of the *municipio*. The *barrio-pueblo* was differentiated from all other *barrios* because it was the historical center of the *municipio* where the seat of government, central plaza, and church were located. The *barrio-pueblo* also formed the core *barrio* of the *zona urbana* (*place*).

Since the 1970's, the use of the terms *pueblo* and *zona urbana* as census designated places (CDP's) rather than political/legal terms introduced some confusion into census data. The *pueblos* and *zonas urbanas* described in the *memorias* had legal political boundaries. The Census Bureau, however, used these same terms (*pueblos* in the 1970 census and *zonas urbanas* in the 1980 and 1990 censuses) as statistical terms that did not necessarily conform to legal political boundaries. This confusion between

the MCD and place entities had a severe impact on the validity of statistical tabulations for the 1970 census. Data were allocated incorrectly for several barrio and subbarrio entities throughout the island.

### Subbarrio

Subbarrios were unique entities that had no stateside statistical equivalents; subbarrios were areas which "nested" within barrios and were likewise used for electoral and legislative districting. For census statistical purposes, they were referred to as sub-MCD's. There were 145 subbarrios distributed within 23 municipios. Barrios-pueblo were subdivided into subbarrios in 20 municipios. In the other three municipios, barrios (other than the barrios-pueblo) were subdivided into subbarrios (one rural barrio in Salinas, one urban barrio in Ponce, and eight urban barrios in San Juan). In several memorias, subbarrios were listed as barrios (or barrios urbanos) in the table of contents but indented under the respective barrio. If any barrio had subbarrios, then the entire barrio was divided into subbarrios. However, 55 barrios-pueblo and all other barrios in Puerto Rico, including 10 in San Juan, had no subbarrios.

### Election District

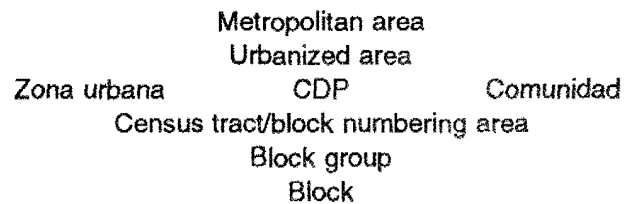
Election districts were defined by the Commonwealth and municipio governments for election purposes and included 8 senatorial and 40 representative districts. Article 3, Section 4, of the Commonwealth Constitution established the principle of revising the senate and assembly districts after each decennial census and prior to the general elections according to the criteria of balanced population among districts, contiguity, compact shape, and means of communication between all parts of the districts.

Although Puerto Rico was not covered by U.S. Public Law 94-171 (specifying redistricting data the Census Bureau would provide to the States), the Bureau furnished it with similar services. As part of this program, and in light of the fact that all voting-district data from the census were for whole census blocks, the Bureau designated a commonwealth liaison to select nonstandard features (e.g., intermittent streams, fencelines, ridgelines) where needed as 1990 census block boundaries. The PRPB, with resources from the Electoral Commission, annotated voting district boundaries according to 1990 census block boundaries on census maps and sent this information to the Bureau, which then delivered maps and population counts by census block, block group, census tract/block numbering area, place (zona urbana and comunidad), subbarrio, barrio, municipio, and election district for redistricting purposes to the Governor, the chief justice of the Supreme Court, and the legislature of Puerto Rico in July 1991. These data were available to anyone else at the cost of reproduction. (See the Block Numbering Definition Program.)

### Statistical Entities

Figure 4 diagrams the most important census statistical units for which data were tabulated in all censuses. Statistical areas were established primarily on the basis of size, shape, contiguity, and socioeconomic and demographic criteria, as well as transportation and commuting flows. However, physical change in settlement patterns or socioeconomic conditions often necessitated changes from census to census. While these entities were first created to better serve the needs of data users by providing reliable data at a submunicipio level (zona urbana, census tract/block numbering area, or block group), statistical areas for 1990 had data tabulated on an inter- and multi-municipio level (metropolitan area, urbanized area, comunidad).

Figure 4. Census Statistical Units in Puerto Rico



### Place

For 1990, the Bureau worked with the Puerto Rico Planning Board and the Puerto Rico Interagency Working Group to make two changes to the criteria for recognizing places. For the 1980 census, Ponce and San Juan were represented in census tabulations as ciudades, each consisting of whole barrios. Additionally, Ponce and San Juan also were represented as zonas urbanas. (In the 1980 census, the municipios of San Juan and Ponce had two categories of place—ciudad and zona urbana. Each used the same name but defined a different geographic area within the same municipio). The 1990 census eliminated the ciudad as a separate category of place; therefore, it recognized Ponce and San Juan only as zonas urbanas. The Planning Board defined the 1990 Ponce and San Juan zonas urbanas either by using the 1980 ciudad and/or zona urbana boundaries, or by defining a new set of boundaries in accordance with these guidelines.

The population criteria for recognition of places in Puerto Rico in census publications did not change for the 1990 census. Zonas urbanas had no minimum population but all comunidades had to have at least 1,000 people, and 2,500 or more to be defined as urban. Both zonas urbanas and comunidades are classified as CDP's. The extent of a zona urbana and comunidad could change at each decennial census based on changes in settlement pattern. Data users often used the statistics for zonas urbanas separately from the data for comunidades. Because each had different qualifying criteria and were distinguished from one another in census reports, it was very important that the Planning Board designate whether a place was a zona urbana or a comunidad. The place name listings that the Bureau gave to the Planning Board showed whether a



1980 CDP was classified as a *zona urbana* or an *aldea*. The Planning Board reviewed this listing and made corrections and updates as a first step in defining 1990 CDP's. In addition to annotating this listing as detailed in the program guidelines, it also verified that the *zona urbana* and *aldea* classifications were correct.

## Metropolitan Area

Although metropolitan statistical areas (MSA's), consolidated metropolitan statistical areas (CMSA's), and primary metropolitan statistical areas (PMSA's) were important statistical units and were closely related to the delineation and naming of urbanized areas, they were not defined or designated by the Census Bureau or Planning Board staff. Rather, the Federal Office of Management and Budget (OMB) did this according to specified standards published in the *Federal Register*. These areas replaced the standard metropolitan statistical areas (SMSA's) and standard consolidated statistical areas (SCSA's) reported in the 1980 census.

An MSA consisted of a large nucleus (or nuclei) together with adjacent communities that had a high degree of economic and social integration with that nucleus (or nuclei). A municipio or group of municipios qualified as an MSA in two ways: (1) a municipio had a central city (or place) of 50,000 or more inhabitants or (2) it had to contain an urbanized area with 50,000 or more inhabitants and a total metropolitan population of at least 100,000 inhabitants. Similar to the urbanized area, the *zona urbana* served as the "central city" because there were no incorporated places in Puerto Rico.

Adjacent municipios were included in the MSA if they were socially and economically integrated with the central municipio. These adjacent municipios met certain published standards regarding metropolitan characteristics such as population density, urban population and population growth, and a specific percentage of their workforce commuting daily to the central nuclei. Any change in the MSA's depended on the results of the 1990 census. In 1983, when the MSA's were revised in Puerto Rico based on the 1980 census, there were 4 MSA's (Aguadilla, Arecibo, Mayagüez, and Ponce) and 1 CMSA, San Juan-Caguas, comprising 45 municipios, which included 76.4 percent of the population. CMSA's were MSA's with a population of at least 1 million that contained separate definable nuclei and met other criteria. PMSA's were components of a CMSA.

## Urbanized Area

Urbanized areas were first established for Puerto Rico in the 1960 census to better separate the rural and urban populations in the vicinity of the larger urban areas (*zonas urbanas*) when the urban population did not necessarily reside in places of 2,500 inhabitants or more. With minor exceptions, all adjacent land included in the urbanized area had to have a minimum population density of 1,000 inhabitants per square mile. Along with this density criterion,

urbanized areas had to have a total population of 50,000 or more inhabitants. Unlike *zonas urbanas*, the urbanized areas did cross municipio boundaries.

The 1990 urbanized area criteria replaced the term central city with central place, in part to accommodate the unique situations in Hawaii and Puerto Rico where incorporated places did not exist. In theory, a *zona urbana* or *comunidad* could have qualified as the central place of an urbanized area if it and its surrounding area met the criteria. In practice, all urbanized areas for the 1990 census had *zonas urbanas* as their central places.

**Zona urbana**—The *zona urbana* was a community that had developed around the historic governmental seat in each municipio. Each municipio could have only one *zona urbana*. With the exception of Florida (which did not have a true *barrio(s)-pueblo*) and San Juan and Ponce (which contained a group of *barrios* comprising the original urban cores of the municipios), all *zonas urbanas* contained their whole *barrio(s)-pueblo* and additional built-up area from adjacent *barrios*. The *zona urbana* reflected intra- and inter-municipio expansion. Cataño *zona urbana* was coincident with the municipio, indicating that the *zona urbana* had reached its fullest extension and that the municipio was entirely urban.

**Comunidad**—The *comunidad*, on the other hand, was a community that often had urban characteristics but was a settlement distinct from the *barrio(s)-pueblo*. (The Bureau changed the term *aldea* (village) to *comunidad* (community) after the Planning Board stated that this was a more accurate label for these places.) The majority of *comunidades*, whose initial impetus derived from land reform programs, were built on government-purchased properties. *Comunidades* were called *aldeas* in the 1960, 1970, and 1980 censuses; earlier censuses also used the term *villages*. The use of the term *comunidad* in the 1990 census was broader and less tied to the traditional *aldea* concept of land reform. This was consistent with the social and economic changes that had occurred in Puerto Rico over the past few decades. New *comunidades* were designated for the 1990 census.

## Census Tract/Block Numbering Area/Block Group/Block

The entire territory of each municipio was divided into either census tracts or BNA's for 1990. These statistical units provided the primary submunicipio levels of data and were probably the most useful set of statistics for data users. Essentially, census tracts were defined in the more metropolitan municipios. In the 1990 census, 56 of the 78 municipios were covered by census tracts as compared with 22 in 1980.

Census tracts were relatively small geographic areas created for the purpose of providing statistics at the submunicipio level. Ideally, census tracts contained between 2,500 and 8,000 persons, with an overall municipio average of 4,000. Census tracts comprised areas of roughly

similar socioeconomic characteristics at the time of their original delineation. BNA's, on the other hand, occurred outside the metropolitan areas and were areas of 1,500 to 3,000 housing units. All census tracts and BNA's were subdivided into smaller areas of socioeconomic homogeneity called BG's, each of which contained an average of 400 housing units. BG's were used for numbering census blocks and could be identified by the census blocks within a census tract/BNA whose numbers began with the same first digit. Due to the requirements that the block group boundaries use visible physical features rather than property lines and other not well known invisible boundaries, some BG's deviated from the ideal population criterion. BG's were the smallest area for which the census published sample data. (In the 1980 census, in areas that were not block numbered, the smallest level for which sample data was available was the enumeration district (ED).

With PRPB's approval and at the suggestion of the Bureau, census tract, BNA, and BG boundaries were moved off nonvisible barrio boundaries in areas where that could have caused field enumeration problems. This was to facilitate enumeration, reduce the number of collection blocks, and improve the accuracy and quality of the data. Enumerators knew the precise boundaries of their assignment areas (ARA's) because they were based on physical features. The likelihood that an enumerator did not canvass an area because he/she thought it was not in his/her area (and thus cause a potential undercount) was greatly reduced. Some census blocks used to collect data were later split by office and field staff into two or more census tabulation blocks in order to allocate housing units to their respective barrio or subbarrio. This was a change in collection techniques over the 1980 census.

## CENSUS GEOGRAPHIC UNITS IN THE VIRGIN ISLANDS AND PACIFIC ISLAND TERRITORIES

The geographic components of the Virgin Islands and the Pacific Island Territories vary as a result of each entity's history, governmental and administrative structure, and the pattern of human settlement. The Census Bureau presents data for the geographic components in terms of a standard framework, the same geographic hierarchy it uses for the States. It also presents the data for some components in an inventory listing, such as all places within an outlying area or all census tract or block numbering areas within a county. The high-level geography for each entity is provided in figure 5 above and explained later in this appendix. (The hierarchy applies only to American Samoa, Guam, the Northern Mariana Islands, Palau, Puerto Rico, and the Virgin Islands. The Census Bureau treats each of the other islands mentioned in this chapter as a single geographic unit.)

Figure 5. 1990 Census Geography for the Pacific Island Territories

| Territories    | State                       | First-order subdivision                      | Minor civil division                            | Place                                |
|----------------|-----------------------------|--|---|--------------------------------------|
| American Samoa | American Samoa <sup>1</sup> | district <sup>1</sup><br>island <sup>2</sup> | county <sup>1</sup><br>island <sup>4</sup>      | village <sup>1</sup>                 |
| Guam           | Guam <sup>1</sup>           | Guam <sup>4</sup>                            | election district <sup>2</sup>                  | CDP <sup>3</sup>                     |
| CNMI           | CNMI <sup>1</sup>           | municipality <sup>1</sup>                    | municipal district <sup>2</sup>                 | CDP <sup>3</sup>                     |
| Palau          | Palau <sup>1</sup>          | state <sup>4</sup>                           | state <sup>4</sup><br>municipality <sup>1</sup> | CDP <sup>3</sup>                     |
| Virgin Islands | Virgin Islands <sup>1</sup> | island <sup>2</sup>                          | census subdistrict <sup>3</sup>                 | town <sup>2</sup> , CDP <sup>3</sup> |

<sup>1</sup>Functioning governmental unit. <sup>2</sup>Legally defined nonfunctioning geographic entity. <sup>3</sup>Statistical entity. <sup>4</sup>False (redundant) entity.

For purposes of data presentation, the Census Bureau treats the Virgin Islands and each Pacific Island Territory (as well as Puerto Rico) as the statistical equivalent of a State. Each entity is divided into first-order subdivisions, similar to counties in most States; however, they are called a variety of terms, none of which is county. (The legal entities called counties in American Samoa represent county subdivisions.) For the 1990 census, every first-order subdivision is divided into census tracts or BNA's, which in turn consist of BG's and blocks. (Only Puerto Rico has census tracts.) For previous decennial censuses, the smallest level of geography was the ED.

Census Bureau data presentations for the Virgin Islands and the Pacific Island Territories (as well as Puerto Rico) are different from the stateside presentation for geographic entities in several ways:

- The Virgin Islands and the Pacific Island Territories (and Puerto Rico) are not part of any census region or division.
- The census data (such as population and housing) for the Virgin Islands and the Pacific Island Territories are not included with that of the United States.
- Neither the Virgin Islands nor any of the Pacific Island Territories have metropolitan areas (MA's) or urbanized areas (UA's).
- The decennial census does not report ZIP Code data for the Virgin Islands or the Pacific Island Territories.

**American Samoa** is an unorganized, unincorporated territory of the United States. It consists of five major volcanic islands and two coral atolls that lie in the heart of Polynesia, 2,500 miles south-southwest of Honolulu and 1,800 miles north-northeast of New Zealand. It is the only U.S. jurisdiction that lies south of the equator. Tutuila Island, which contains the historic capital of Pago Pago, the seat of government at Fagatogo, and the office of the Governor at Utulei, encompasses 70 percent of American Samoa's 77.3 square miles and over 95 percent of its 46,773 inhabitants.

There are three districts that make up the first-order subdivisions: Eastern and Western on Tutuila Island (Eastern District also includes the island of Aunu'u) and Manu'a (composed of Ofu, Olosega, and Ta'u Islands). Swains Island and Rose Island are not in any district. The districts are divided into 14 counties that compose the MCD's. All land area of American Samoa except Rose Island is assigned to a village. Each village has a village chief, or pulenuu, whom the Governor of American Samoa appoints from among the chiefs resident in each village, and a village council, which consists of all the chiefs and heads of families resident in the village. Accordingly, the Census Bureau treats the villages as if they were incorporated places.

The Census Bureau, for statistical purposes, recognizes only those villages with both a pulenuu and a village council in accordance with the American Samoa Code. (Some villages have a single council, but have pulenuus associated with separate areas; in those instances, the Census Bureau identified block boundaries that approximately delimited each such area so the data users could allocate 1990 census figures to each portion of the village.) Because the village boundaries are traditional and not fixed by law, the Census Bureau recognizes them on its maps as traditional boundaries rather than as legally documented corporate limits, and does not show village boundaries at all, if possible. Contrary to information that the American Samoa government provided to the Census Bureau for the 1980 census, the county boundaries—but not the district boundaries—change as village boundaries adjust to changing ownership and court decisions. Thus, for the 1990 census, the villages nested within counties except where a village crossed a district line (only Nu'uuli village does so).

As it had in the past, the Economic Development Planning Office of the American Samoa government provided the information necessary for the Census Bureau to identify and delineate the several legal entities. The Census Bureau also worked with that agency to establish BNA's and BG's that would result in 1990 census data for meaningful geographic units. The BNA's were to contain, as an optimum, 300 housing units, but could range from 250 to 900; BG's were to contain 70 housing units as an optimum, but could range from 50 to 100. The BG's also served as the basic geographic units—called ARA's—used as enumerator assignments for performing the enumeration. For the 1980 census, the Census Bureau assigned one ED to each village or village part, with oversized ED's to be split in the field to facilitate the enumeration.

**Guam** is the largest and southernmost island of a chain of volcanic islands in part of Micronesia known as the Marianas Archipelago. It is an organized, unincorporated territory of the United States and is located in the western Pacific Ocean, 6,000 miles southwest of San Francisco, 3,700 miles west of Honolulu, 1,500 miles south of Tokyo, and 1,500 miles east of Manila.

The Census Bureau recognizes no first-order subdivisions of Guam, so the entire island serves as a single

county equivalent for census statistical purposes. Guam is subdivided into 19 election districts, which the Census Bureau treats as MCD's. These entities do not have functioning governments; they are administrative areas for electing mayors. The island also is divided into 15 municipalities, or villages. By legislation effective August 14, 1956, the 15 municipalities underwent an extensive reorganization to match the current election districts. At the request of the Guam government, the Census Bureau has recognized the current election districts as MCD's since the 1960 census; prior to that time, the decennial census recognized the following:

- 1920—towns, barrios, one city (Agana, the capital), one district, and one municipality.
- 1930—eight municipalities and a naval reservation, the municipalities primarily consisted of towns, barrios, and Agana city.
- 1940—15 municipalities, consisting of towns and barrios; 1 was coextensive with Agana city, which was further divided into 10 districts.
- 1950—15 municipalities, which included 19 villages and 1 city.

Until the 1980 census, the Census Bureau referred to the places in Guam as cities, towns, and villages even though they were not incorporated places in the stateside sense of that term. For the 1980 census, 32 unincorporated settlements were identified more accurately as CDP's. To qualify as a CDP, an area delineated by local officials as a potential CDP had to contain at least 300 people. The same 32 CDP's appeared in the 1990 census; 6 of the CDP's represented military housing areas. To ensure that Agana would appear in the census tabulations, a special criterion permitted it to qualify as a CDP regardless of its population count; as it turned out, the special rule was not needed because instead of an anticipated decline, Agana grew from a population of 896 in 1980 to 1,139 in 1990.

Guam was block-numbered for the first time in the 1990 census. To provide data for locally useful areas, local officials delineated a BNA and BG plan for the Census Bureau. The BNA's for Guam were to contain an optimum of 650 housing units, but could range from 500 to 1,200; BG's were to contain an optimum of 140 housing units and could range from 90 to 190. For the 1980 census, local officials designed the ED's, using an optimum of 140 and a range of approximately 100 to 160 housing units as the criteria. In both censuses, the Census Bureau worked with two Guam agencies—the Bureau of Planning and the Department of Commerce—to obtain information about both legal and statistical entities and to conduct the decennial, economic, and agriculture censuses. In turn, these agencies worked with appropriate territorial agencies to ensure that the census geographic units would be meaningful entities for local data users.

**The Northern Mariana Islands**, which is part of Micronesia, comprises the former Mariana Islands District of the Trust Territory of the Pacific Islands. It consists of three

main islands—Saipan, Tinian, and Rota—and several small islands and atolls. It is located just north of Guam; Saipan lies about 125 miles northeast of Guam, but southernmost Rota is less than 50 miles from Guam. The islands that constitute the Northern Marianas encompass some 430 miles from Rota in the south to Uracus Island in the north, but it is only 75 miles from Rota to Saipan; the lightly populated Northern Islands (an exodus, primarily due to volcanic activity, reduced the number to only 36 in 1990) stretch over some 300 miles of the Pacific. The Commonwealth's capital is Saipan, but no locality on that island is recognized specifically as the capital; several (but not all) government offices are located in the CDP of Capital Hill, but the legislature meets in Susupe. Almost 90 percent of the population lives on Saipan.

For the 1990 census, the Census Bureau dropped the Mariana Islands District of the TTPI from its records; previously it had served as the county-equivalent, first-order subdivision of the CNMI. Accordingly, each lower-level entity was elevated one step in the hierarchy; that is, municipalities were no longer treated as MCD's but as the statistical equivalents of counties, and municipal districts were recognized as MCD's rather than sub-MCD's (see table). The municipalities of Rota, Saipan, and Tinian each coincided with one of the major islands, except that Tinian also included uninhabited Aguijan (or Aguiguan) Island. The municipalities are governmental units, each with its own elected mayor and municipal council, except that Saipan's municipal council also serves the Northern Islands Municipality and its mayor.

The 11 municipal districts are subdivisions delineated by law, but they no longer serve any governmental function. Nevertheless, late in the 1990 census process, the CNMI government informed the Census Bureau that the districts, though obsolete, were to be retained for the 1990 census, presumably for historical comparability and because they are the basis for defining Saipan's four election districts.

The places in the CNMI are CDP's; there were 16 places in the 1990 census that qualified as CDP's in that they had at least 300 people. The CNMI was block-numbered for the first time for the 1990 census. To provide data for locally useful areas, the Census Bureau tried to delineate BG's that approximated the ED's that the TTPI had used for the 1980 census; the Census Bureau then worked with the CNMI's Department of Commerce and Labor—which also delineated the CDP's and undertook the 1990 census—to review and refine these areas and then group them into statistically useful BNA's.

**Palau** is the westernmost group of the Caroline Islands. It lies some 500 miles southwest of Guam and 1,000 miles southeast of Manila. It consists of one very large island (Babelthuap, or Babeldaob), three islands that contain most of the population in and near the capital of Koror, and hundreds of other islands, islets, and atolls spread out over some 420 miles of the Pacific. Because it was still under

United States jurisdiction on January 1, 1990, the Census Bureau included Palau in the 1990 census. The Census Bureau treats Palau as the statistical equivalent of a State.

For the 1990 census, the Census Bureau dropped the Palau District of the TTPI—it had served as the county-equivalent, first-order subdivision of Palau—and elevated each lower-level entity one step in the hierarchy. The 16 municipalities, reported as MCD's in the 1980 Census, were superseded by States upon ratification of Palau's constitution on July 9, 1981; the Census Bureau treats the States as the statistical equivalents of counties. Each of the 16 States has its own constitution and officials. Maps certified by the Palau government for the Census Bureau's use in the 1990 census relocated many of the boundaries of the former municipalities, but all the changes—some minor, some substantial—occurred in uninhabited territory. The 1980 census had identified the numerous islands between Koror and Peleliu as unorganized territory; the 1990 census corrected this error by reassigning the islands to the States of Koror (primarily) and Peleliu. Only Sonsorol State is divided into MCD's, called municipalities—one for each of its four islands; for the other States, the Census Bureau represents the MCD level by a coextensive false entity that repeats the State name. The municipal districts, reported as sub-MCD's in the 1980 census, no longer exist.

The 1970 census reported data for only one place—Koror—which was referred to incorrectly as a town. For the 1980 and 1990 censuses, the Census Bureau recognized places as CDP's, provided that they had a census population of at least 300. Three settlements qualified as CDP's for both the 1980 and 1990 censuses. In their constitutions, five of the States identify place-type entities: municipalities in Ngarchelong; villages in Airai; and hamlets in Aimeliik, Ngchesar, and Ngiwal. These very small settlements, which sometimes adjoin one another, are based only on tradition and who lives in which house; each has its own chief, but does not have formal boundaries—nor could Palauan officials draw approximate boundaries that would permit the Census Bureau to recognize these traditional entities for the 1990 census similar to the villages of American Samoa. Palau was block-numbered for the first time for the 1990 census. To provide data for locally useful areas, the Census Bureau tried to delineate BG's that approximated the ED's used for the 1973 and 1980 censuses. It worked with Palau's Office of Planning and Statistics (which delineated the CDP's and conducted the census) to review and refine these areas and for the first time, the Census Bureau selected block boundaries for the 1990 census that would permit approximate separate identification of most of the small settlements, thereby enabling data users to assemble block counts for each one.

**The Virgin Islands of the United States** is an organized, unincorporated territory of the United States located immediately east of Puerto Rico. Although more than 50 separate islands and cays constitute this westernmost of the Lesser Antilles, only three have a size and population of

any significance: St. Thomas, St. Croix, and St. John. Almost all the other islets are both uninhabited and uninhabitable. Most of the population is shared equally by St. Croix and St. Thomas, although St. Croix is considerably larger in area. The capital is located in Charlotte Amalie on St. Thomas.

The Census Bureau treats the three main islands as the statistical equivalents of counties, but they do not have their own governments. Nearby islands are included with the closest large island; for example, Water Island, offshore from Charlotte Amalie, is included with St. Thomas.

Until the 1980 census, the Census Bureau reported sub-island data by quarters, which primarily and historically serve as areas for land recordation; the quarters are further divided into estates, which the Census Bureau has never recognized in its data presentations. Because these old Danish units have no major legal significance—their boundaries typically are straight lines that follow no visible features and have no relationship to the rugged terrain—and because the Virgin Islands needed a modern geographic unit that was more meaningful for the tabulation of decennial census data, the Virgin Islands government created census subdistricts. Legally established by Act No 4349 on October 1, 1979, the subdistricts are intended to be permanent areas that reflect the territory's land-use planning districts. The Census Bureau first used the subdistricts as the statistical equivalents of MCD's for the 1980 census.

The Census Bureau recognizes three towns for the decennial census of the Virgin Islands—Charlotte Amalie, Christiansted, and Frederiksted. These places were held as separate MCD's and incorrectly referred to as cities prior to the 1980 census. Because these entities have legal boundaries that are defined by chapter 5 of the Virgin Islands Code, and serve specific administrative purposes, the Census Bureau treats them as equivalent to incorporated places; however, they do not have their own governments and are not incorporated places in the same sense as that term applies to such entities in the United States. The Census Bureau may recognize other settlements as CDP's if they have at least 300 inhabitants; 6 CDP's qualified for the 1980 and 1990 censuses.

The Virgin Islands were block-numbered for the first time for the 1990 census. At the request of the Virgin Island's government, the BG's for the 1990 census were required to have 140 to 160 housing units so that they could be designed to approximate the ED's used for the 1980 census. The Virgin Islands Planning Office delineated the BG's and then grouped them into a meaningful set of BNA's for the 1990 census; it also delineated the CDP's for the 1980 census, which were carried forward unchanged for the 1990 census. The census itself actually was conducted under the auspices of the University of the Virgin Islands.

## APPENDIX 13E.

### Supply Kits Assembled and Shipped to Virgin Islands, and Pacific Outlying Areas During the 1990 Census

| Kit number                           | Description   | Quantity |
|--------------------------------------|---|----------|
| 660 (Outlying Areas)                 | Advance Lister Trainee  | 143      |
| 660A (Outlying Areas)                | Advance Lister Instructor   | 26       |
| 555 (AS, CNMI)                       | List Enumerate—CL Supply  | 38       |
| 555 (G,P,VI)                         | List Enumerate—CL Supply  | 100      |
| 655 Outlying Areas (AS,CNMI)         | List Enumerate—Crew Leader Instructor                                 | 8        |
| 655 Outlying Areas (G,P,VI)          | List Enumerate—Crew Leader Instructor                                 | 20       |
| 655A Outlying Areas (AS,CNMI)        | List Enumerate—Crew Leader Trainee                                    | 38       |
| 655A Outlying Areas (G,P,VI)         | List Enumerate—Crew Leader Trainee                                    | 100      |
| 549 Outlying Areas (AS)              | Enumerator Supplies for American Samoa                                | 138      |
| 549 Outlying Areas (CNMI)            | Enumerator Supplies/Commonwealth of the Northern<br>Mariana Islands   | 105      |
| 549 Outlying Areas (G)               | Enumerator Supplies for Guam  | 372      |
| 549 Outlying Areas (P)               | Enumerator Supplies for Palau   | 62       |
| 549 Outlying Areas (St. Croix, VI)   | Enumerator Supplies for St. Croix, VI                                 | 152      |
| 549 Outlying Areas (St. Thomas, VI)  | Enumerator Supplies for St. Thomas, VI                                | 142      |
| 649 Outlying Areas (AS)              | Enumerator Instructor—American Samoa                                  | 29       |
| 649 Outlying Areas (CNMI)            | Enumerator Instructor—Commonwealth of the<br>Northern Mariana Islands | 18       |
| 649 Outlying Areas (G)               | Enumerator Instructor—Guam  | 54       |
| 649 Outlying Areas (P)               | Enumerator Instructor—Palau   | 11       |
| 649 Outlying Areas (St. Croix, VI)   | Enumerator Instructor—St. Croix, VI                                   | 27       |
| 649 Outlying Areas (St. Thomas, VI)  | Enumerator Instructor—St. Thomas, VI                                  | 29       |
| 649 Outlying Areas (AS)              | Enumerator Trainee—American Samoa                                     | 125      |
| 649A Outlying Areas (CNMI)           | Enumerator Trainee—Commonwealth of the Northern<br>Mariana Islands    | 105      |
| 649A Outlying Areas (G)              | Enumerator Trainee—Guam   | 372      |
| 649A Outlying Areas (P)              | Enumerator Trainee—Palau  | 62       |
| 649A Outlying Areas (St. Croix, VI)  | Enumerator Trainee—St. Croix, VI                                      | 152      |
| 649A Outlying Areas (St. Thomas, VI) | Enumerator Trainee—St. Thomas, VI                                     | 142      |

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# CHAPTER 14.

## 1990 Census Content: Population and Housing Items

### INTRODUCTION

This chapter describes each population and housing item in the basic questionnaires used for the 1990 census in terms of its purpose and history, the instructions for completing each question, any relevant coding instructions, and computer editing and allocation specifications.

The two primary 1990 census questionnaires were (1) the "short" form (D-1), which contained only the "100-percent" items, i.e., those questions asked of every person and about each housing unit; and (2) the "long" form (D-2), which included both the 100-percent items and additional questions asked of the occupants of a sample of the housing units. About 84.5 percent of the population nationwide completed the short form. A variable-rate sample design was used for the recipients of the long-form questionnaire. In most of the country, only 1 of every 6 households received the long form; however, in small governmental jurisdictions (those with 2,500 or fewer inhabitants), 1 of every 2 households received the long form to ensure greater accuracy of the data collected. A 1-in-8 sample was used in most densely populated areas. (See ch. 9 for sampling details and app. 14A for a facsimile of the D-2.)

In addition to the two basic questionnaires, special forms were used to enumerate people in group quarters. These included the Individual (D-20A and D-20B), Military (D-21), and Shipboard (D-23) Census Reports, known as the ICR, MCR, and SCR, respectively.

Also, for the first time, the census attempted to enumerate two segments of the population that had no usual residence (often referred to as the "homeless" population)—the visible street and shelter populations—in two phases, using ICR's. The first phase (on the night of March 20, using forms D-20A and D-20B) enumerated people in pre-identified emergency shelters (public and private) and hotels/motels and flophouses charging \$12 or less (excluding taxes) per night; Salvation Army shelters, hotels, and motels used partly or entirely for homeless persons, regardless of the nightly rate charged, and similar places known to house individuals having no usual home elsewhere; and shelters for abused women. (See "Group Quarters" for more information on S-Night.)

Phase 2 (on March 21, using form D-20A only) covered individuals on the streets, in various places of commerce, in abandoned buildings, and the like (wherever people could be found outside of regular housing units or group quarters).

Upon request, individuals could receive Spanish-language versions of the standard short- and long-form questionnaires and the ICR. Enumerators also used foreign-language

guides prepared in 32 different languages when interviewing respondents who could not understand English. (See app. 14A at the end of this chapter for facsimiles of several questionnaires and note ch. 6 for a discussion of questionnaire usage during enumeration.)

For facsimiles and discussion of the separate questionnaires developed for Puerto Rico and outlying areas, see Chapter 13 ("Puerto Rico, Virgin Islands, and the Pacific Island Territories"). The content items (also discussed in ch. 13) differed somewhat from those used in the States.

### Data Collection and Processing

Chapter 6 ("Field Enumeration") details the field collection of census data. Chapters 6, 7 ("Processing Office Organization and Questionnaire Handling"), and 8 ("Pre-tabulation Processing") discuss the handling of the questionnaires. Chapter 8 covers the microfilming of the household questionnaires and the conversion of the microfilmed responses to computer tape through the use of FOSDIC (film optical sensing device for input to computers) equipment. The ICR, MCR, and SCR questionnaires were not FOSDIC-readable and were not microfilmed. Instead, staff members at each of the seven processing offices keyed the information they contained into computer files, which underwent a series of clerical and computerized reviews for completeness and accuracy. Then, the data were stored until needed for tabulation.

The Census Bureau used three basic types of enumeration to get responses to the census: mailout/mailback, list/enumerate, and update/leave/mailback. The **mailout/mailback** method was used to enumerate about 207.4 million persons in about 86.2 million housing units located in cities, towns, suburban areas, selected rural areas, and small towns in rural areas where mailing addresses consisted mainly of house numbers and street names or other addresses that permitted letter carriers to deliver questionnaires to specific housing units. In the **list/enumerate** method (formerly the "conventional" or door-to-door method), the agency enumerated approximately 5.5 million housing units in all of the 70 type 3 district offices (DO's). The **update/leave/mailback** method was used mainly in densely populated rural areas where it was difficult to develop mailing lists because mailing addresses did not use house numbers and street names. The Census Bureau compiled lists of housing units in advance of the census. Enumerators delivered the questionnaires, asked respondents to fill them out and return them by mail, and added housing units not on the mailing lists. This method was used mainly in the South and Midwest and included some high-rise, low-income urban areas. A variation of this method was used in

urban areas having large numbers of boarded-up buildings. About 11 million housing units were enumerated using this method. For further descriptions of these methods, see Chapter 6 ("Field Enumeration").<sup>1</sup>

On March 23, 1990, the U.S. Postal Service (USPS) delivered census questionnaires to about 83 percent of all residential addresses in the country, primarily in metropolitan areas. The Census Bureau asked residents in these areas to mail their completed questionnaires (either the short or long form) by April 1 to the appropriate census office in the enclosed, pre-addressed envelope and sent a reminder card on March 30 to improve the response rate. For another 11 percent of the Nation's housing units, mostly in rural and seasonal-housing areas in the South, Appalachia, and parts of the Midwest where addresses did not specifically identify housing units precisely enough for followup purposes, enumerators visited every housing unit before Census Day and left a census questionnaire for the householder to complete and return by mail. In these areas, the enumerators verified the mailing address at the time they dropped off questionnaires. The Bureau mailed reminder cards to these housing units on March 30. In sparsely populated parts of the country with hard-to-determine mailing addresses where enumerators could not drop off questionnaires cost effectively, the USPS delivered unaddressed questionnaires to all known housing units. Members of each household had instructions to complete the form and hold it for collection by an enumerator, who would record the address when he or she picked up the questionnaire. This technique applied to only 6 percent of all households but covered 50 percent of the Nation's land area.

Along with the short- or long-form questionnaire, respondents received a brochure, entitled "Your Guide for the 1990 U.S. Census Form" (D-3 for the short form and D-4 for the long one), containing information and instructions for completing the form. (See app. 14A for a facsimile of the D-4.)

In mail-census areas (these included areas where the USPS delivered questionnaires and update/leave/mailback areas where the Census Bureau enumerators delivered questionnaires), enumerators followed up on nonresponse households (those not returning questionnaires), vacant units, or households for which they needed further information. In list/enumerate areas, enumerators visited every housing unit to collect completed questionnaires or to conduct an interview at each household that had not filled one in and to administer a long-form questionnaire at a sample of housing units. In both areas, enumerators had specific instructions (in the D-561, *Questionnaire Reference Book*, and the *Enumerator's Manual*, forms D-546, D-547, and D-548) on how to conduct an interview, ask each question, and fill in the respondents' answers to

certain questions. These instructions, designed to maximize self-enumeration by having the respondent provide the answers, aimed to minimize the amount of error introduced into data collection by the enumerator. Census takers could bias the enumeration process by asking a question (or recording an answer) in a particular way or by completing a sensitive item such as "race" (question 4) by observation instead of inquiry.

**Coding**—A portion of the questions had handwritten responses. Unlike the machine-readable questions on the forms, handwritten responses were keyed into the data-capture file (DCF, see ch. 8). In order to generate population and housing statistics, handwritten responses were coded numerically by automated and clerical processes during the following decennial operations: (1) industry and occupation coding (I&O); (2) 100-percent race coding; (3) place-of-work, migration, and place-of-birth coding (POW/MIG/POB); and (4) general coding (GEN).

General coding activities were performed entirely at Census headquarters (HQ). The write-in responses coded during this operation pertained to these questions: 2 (relationship), 4 (race), 7 (Spanish/Hispanic origin), 13 (ancestry), and 15b (language spoken at home).

**Editing and allocation**—Editing of mail returns was conducted clerically in every type of district office, except type 1. Once the seven temporary, computer-equipped, processing offices (PO's) received the questionnaires, edit clerks reviewed them, prior to tabulation, to detect missing or multiple answers (content edit) or indications of possible missed persons (coverage edit), and then accepted or failed questionnaires based on preset tolerance levels of error or the number of failures per person or item that constituted passing or failing a questionnaire. Tolerances differed for the long and short forms. (See ch. 8 for an example of tolerance rules in relation to the content and coverage edit procedures.)

Edit clerks reviewed the questionnaires for general problems, scanned the pages for those that required repair, and edited as necessary. For example, if a write-in answer was given when an answer circle should have been filled, they were to fill the correct circle, if it was possible to determine from the written entry which circle should have been filled, and erase any lines that crossed other answer circles. If it was not possible to determine which circle to fill, the number for questions 2 through 7 was entered above the person columns or the question number for questions 8 to 33 and H1 to H26 was circled for each question failing edit. Also, if a checkmark (√) or "X" was used to indicate an answer and the (√) or "X" crossed two or more circles, then they were to erase any part of the (√) or "X" that crossed circles not intended as the answer. The instructions applied to all questionnaires (both short and long forms) and all questions.

After the PO's keyed the write-in information, HQ staff created files of all responses on a flow basis as captured. During computer matching, they extracted one occurrence

<sup>1</sup>For facsimiles of most of the 1990 census questionnaires, see 1990 Census of Population and Housing, *1990 Census Questionnaires and Other Public-Use Forms*, 1990 CPH-R-5, (Washington, DC: Government Printing Office, 1993).

of each response and matched it against the master file, which originated as a coded set of write-ins compiled from the 1980 census, the 1986 test censuses, and the 1988 dress rehearsal (see ch. 2 for discussion) and updated the number of occurrences for each matching response. Responses not already in the master file were added, along with the associated number of occurrences. Using an interactive coding system, subject-matter experts assigned codes to the responses added during the computer matching. The coding system recorded the date and coder's initials for each code assigned.

A quality-assurance (QA) plan (see chs. 7 and 8) provided feedback to coders on their performance, found and corrected errors, and evaluated the accuracy and consistency of expert coding. The QA plan covered the 100-percent race coding operation, which began in August 1990, and the GEN coding operation, which began in November 1990.

Before editing and allocation began, the sample population items were also subjected to a computer "pre-edit" (app. 14B) to make certain that code boxes had been filled in the clerical operation in cases where they were supposed to be and contained the appropriate number of blackened FOSDIC circles. If too many omissions were found, the work unit (consisting of up to 30 long or 100 short forms) was set aside for further attention. The pre-edit also made certain that each coded value was within established bounds. The responses from each household were edited prior to tabulation to detect missing responses, inconsistencies between related responses, and violations in standard definitions or relationships between characteristics.

The edits addressed one question at a time for everyone in the household. Reported values that did not pass the edits were blanked and filled based on other available information. Missing values were filled from the related responses provided by the other household members or, if necessary, from responses provided by individuals in other housing units who had similar characteristics or the nearest housing unit with similar reported characteristics. In some cases, "substitution" was used. This process involved the imputation of data for a person or housing unit known to exist but for which the questionnaire lacked information. A full set of characteristics for the person or housing unit was duplicated based on information about a similar previously processed person or housing unit. (See app. 14B for the edit sequences of the complete-count and sample population and housing items.)

Data-defined individuals were those with two or more responses to the 100-percent population items. Any person who did not meet this criterion was considered nondata defined. If the number of nondata-defined individuals exceeded certain limits, the entire household was replaced (substituted) by a donor household. "Substitution" represented the imputation of data for a person or housing unit known to be present but for which the questionnaire lacked information. A previously processed person or housing unit was drawn from the file under certain criteria, and the full set of

characteristics for the person or housing unit was duplicated. The number of nondata-defined individuals that could be accepted before the unit was substituted depended on household size:

#### Whole-Household-Substitution Procedures

| Persons in unit | Acceptable number of nondata-defined persons |
|-----------------|--|
| 1 or 2          | 0  |
| 3               | 1  |
| 4 or 5          | 2  |
| 6 or 7          | 3  |
| 8 or 9          | 4  |

In the "allocation" process, a characteristic (for example, age, race, or rent) was assigned to a person or housing unit in the absence of an acceptable entry on the census questionnaire. The general procedure for inserting omitted entries or changing unacceptable entries was to assign an entry for a person that was consistent with other entries for that person or entries for other respondents with similar characteristics. The procedure was similar for missing housing entries.

#### Housing Units

The Census Bureau defined a housing unit as a house, apartment, group of rooms, or single room occupied as a separate living quarters or, if vacant, intended for occupancy as a separate living quarters. Living quarters were classified as structures intended for residential use (for example, a one-family home, apartment house, hotel or motel, boarding house, or mobile home). Living quarters also may have been structures intended for nonresidential use (for example, the rooms in a warehouse where a guard lived), as well as in places such as tents, vans, shelters for the homeless, dormitories, barracks, and old railroad cars.

Housing questions appeared on page 3 of the short form and pages 3, 4, and 5 of the long form. These questions, preceded by the letter "H," pertained mainly to the housing unit for which the questionnaire was addressed. As in 1980, vacant units were considered "Regular," except when all occupants of a housing unit claimed another address as their "Usual home elsewhere"; and the basic classifications "Occupied" and "Vacant" continued as before (see item "B" of the "For Census Use" box on page 3 and specific question discussions).

The short-form questionnaire contained seven questions on housing data. These included units in structure (H2), number of rooms (H3), tenure (H4), 10 or more acres (item H5a), business on property (H5b), value of property (H6), monthly rent (H7a), and meals included in rent (H7b). The vacancy items of the "For Census Use" box (see discussion below) on page 3 of this form also related to the housing questions. The housing edit specifications indicated that the edit and allocation procedures on each of these items were to be performed simultaneously. The

specifications also included the "For Census Use" box vacancy edits. The order in which each of these items was reviewed and adjusted for a given questionnaire identification follows: H4, "For Census Use" boxes (vacancy status, month vacant, boarded up), H2, H3, H5a, H5b, H6, H7a, and H7b.

## Group Quarters

All respondents not living in households were classified by the Census Bureau as living in group quarters.<sup>2</sup> Only population data were collected in group quarters, using ICR's. Two general categories of people were recognized in group quarters: (1) institutionalized individuals and (2) other people in group quarters (also referred to as "noninstitutional group quarters").

The **Institutional Population** included people under formally authorized, supervised care or custody in institutions at the time of enumeration. Such people were classified as "patients or inmates" of an institution, regardless of the availability of nursing or medical care, the length of stay, or the number of individuals in the institution. Generally, institutionalized people were restricted to the institutional buildings and grounds (or had to have "passes" or escorts to leave) and thus had limited interaction with the surrounding community. Also, they were generally under the care of trained staff who had responsibility for their safekeeping and supervision. Institutions included correctional facilities, including halfway houses operated for correctional purposes; nursing homes, convalescent homes, and rest homes for the aged and dependent; juvenile institutions, including homes, schools, hospitals, orphanages, or residential-care facilities for neglected, abused, and dependent children; schools, hospitals, or wards for the physically or mentally handicapped; hospitals or wards for mental, tubercular, or chronic disease patients; patients in wards of general and military hospitals who had no usual home elsewhere; hospital wards for drug/alcohol abuse; and rooms for long-term-care patients in wards or buildings on the grounds of hospitals. "Staff residents," that is, staff personnel who lived at the institution were classified with the "Noninstitutional group quarters" population.

The term, **Other Persons in Group Quarters (also referred to as "noninstitutional group quarters")**, included all individuals who lived in group quarters other than institutions. People who lived in the following living quarters were classified as "other persons in group quarters" when there were 10 or more unrelated individuals living in the unit; otherwise, these living quarters were classified as housing units: (1) rooming and boarding houses; (2) religious group quarters such as convents, monasteries, or rectories; (3) college quarters off campus; and (4) community-based group homes, including those which provided supportive services for the mentally ill, mentally retarded and

physically handicapped, homes or halfway houses for drug/alcohol abuse, communes, and maternity homes for unwed mothers.

People residing in certain other types of living arrangements were classified as living in "Noninstitutional" group quarters, regardless of the number of people sharing the unit. These included individuals residing in (1) dormitories for agricultural or other workers; (2) dormitories for nurses and interns in general and military hospitals; (3) college-student dormitories and fraternity and sorority houses on campus; (4) military quarters, including barracks or dormitories on base, transient quarters on base for temporary residents (both civilian and military), and military ships; (5) quarters for staff members of institutions; (6) other non-household living situations, such as commercial or government-run campgrounds, campgrounds at racetracks, fairs, carnivals, and youth hostels; (7) crews of civilian vessels; and (8) people enumerated during the Shelter and Street Night operation, including those living in emergency shelters (public and private) for homeless people with sleeping facilities, missions, hotels/motels and flophouses charging \$12 or less (excluding taxes) per night; flop houses, Salvation Army shelters, hotels and motels used *entirely* for homeless people (regardless of the nightly rate charged); rooms in hotels and motels used *partially* for the homeless, shelters for runaway, neglected, and homeless children, shelters for abused women, sites designated before the census by local officials as places where the homeless congregate at night, such as street corners, abandoned and boarded-up buildings, parks, bridges, noncommercial campsites ("tent cities"), and places of commerce, such as bus depots, train stations, and airports.

Special procedures and questionnaires were used for the enumeration of individuals in group quarters. The special questionnaires (ICR's, MCR's, and SCR's) included 100-percent population questions but did not include housing inquiries. In all group quarters, all persons were asked the basic population questions; and additional questions were asked of a sample (1-in-6) of persons.

**Comparability**—For the 1990 census, the definition of institutionalized individuals was revised so that the definition of "care" only included people under organized medical or formally authorized, supervised care or custody. As a result of this change to the institutional definition, maternity homes were classified as noninstitutional rather than institutional group quarters as in previous censuses. The following types of group quarters were classified as institutional rather than noninstitutional: "halfway houses (operated for correctional purposes)" and "wards in general and military hospitals for patients who have no usual home elsewhere," which included maternity, neonatal, pediatric, military, and surgical wards of hospitals, other purpose wards of hospitals, and wards for infectious diseases. These changes should not significantly affect the comparability of data with earlier censuses because of the relatively small number of persons involved.

<sup>2</sup>The visible-in-the-street population was classified as part of the group quarters population even though these individuals had no visible living quarters.

As in 1980, 10 or more unrelated individuals living together in housing units were classified as living in non-institutional group quarters. In 1970, the criterion was six or more unrelated people.

Several changes also occurred in the identification of specific types of group quarters. For the first time, the 1990 census identified separately the following types of correctional institutions: people in Federal detention centers, halfway houses (operated for correctional purposes), military stockades and jails, and police lockups. In 1990, tuberculosis hospitals or wards were included with hospitals for the chronically ill; in 1980, they were shown separately. For 1990, the noninstitutional group quarters category ("Group homes") was classified as group homes for drug/alcohol abuse, maternity homes (for unwed mothers), group homes for the mentally ill, group homes for the mentally retarded, and group homes for the physically handicapped. People living in communes, foster-care homes, and job-corps centers were classified with "Other group homes" only if 10 or more unrelated individuals shared the unit; otherwise, they were classified as housing units.

In 1990, workers' dormitories were classified as group quarters, regardless of the number of people sharing the dorm. In 1980, 10 or more unrelated individuals had to share the dorm for it to have been classified as a group quarters. In 1960, data on people in military barracks were shown only for men; in subsequent censuses, they included both men and women.

For 1990, the phrase "inmates of institutions" was changed to "institutionalized persons." Also, people living in noninstitutional group quarters were referred to as "other persons in group quarters," and the phrase "staff residents" was used for staff living in institutions.

In comparison with 1980, the 1990 census introduced several new components to institutional and noninstitutional group quarters. The institutional categories added included "hospitals and wards for drug/alcohol abuse" and "military hospitals for the chronically ill." The noninstitutional group quarters categories added included emergency shelters for people with no usual residence; shelters for runaway, neglected, and homeless children; shelters for abused women; and visible in street locations. Each of these noninstitutional group quarters was enumerated on March 20-21, 1990, during the "Shelter and Street Night" operation.

### **Shelter and Street Night (S-Night)**

There is no generally agreed-upon definition of "the homeless," and there are no limitations in the census count that prevent obtaining a total count of the homeless population under any definition. As such, the Census Bureau does not have a definition and did not attempt to provide a total count of "the homeless." Rather, the Bureau provided counts and characteristics of people found at the time of the census in selected types of living arrangements.

In preparation for S-Night enumeration, the regional census centers (RCC's) mailed a certified letter (Form D-33(L)) to the highest elected official of each active

functioning government of the United States (approximately 14,200 local jurisdictions responded) requesting that they identify: (1) all shelters with sleeping facilities (permanent and temporary, such as church basements, armories, public buildings, and so forth, that could be open on March 20); (2) hotels and motels used to house homeless persons and families; (3) a list of outdoor locations where homeless individuals tended to be at night; (4) places such as bus or train stations, subway stations, airports, hospital emergency rooms, and so forth, where homeless persons sought shelter at night; and (5) the specific addresses of abandoned or boarded-up buildings where homeless individuals were thought to stay at night.

The letter from the RCC's to the governmental units emphasized the importance of listing night-time congregating sites. The list of shelters was expanded using information from administrative records and informed local sources. The street sites were limited to the list provided by the jurisdictions. All governmental units were eligible for S-Night. For cities with populations of 50,000 or more (about 1,400), the Census Bureau took additional steps to update the list of shelter and street locations in the local jurisdictions that did not respond to the certified letter. Less populous cities and rural areas participated if the local jurisdictions provided a list of shelters or open public places for the Census Bureau to visit or if shelters were identified through the Bureau's inventory development, local knowledge update, or during a Special Place Prelist operation.

The Census Bureau collected data for people at selected locations where people with no usual residence were found in the 1990 census. S-Night was a special census operation to count the population in four types of locations where the "homeless" people were found. On the evening of March 20, 1990, and during the early morning hours of March 21, 1990, enumerators counted people in pre-identified locations: (1) emergency shelters for the homeless population (public and private, permanent and temporary); (2) shelters with temporary lodging for runaway youths; (3) shelters for abused women and their children; and (4) open locations in streets or other places not intended for habitation.

Emergency shelters included all hotels and motels costing \$12 or less (excluding taxes) per night, regardless of whether the persons living there considered themselves to be homeless, hotels and motels (regardless of cost) used entirely to shelter homeless individuals, and pre-identified rooms in hotels and motels used for homeless persons and families. Enumeration in shelters usually occurred from 6 p.m. to midnight; street enumeration, from 2 a.m. to 4 a.m.; abandoned and boarded-up buildings, between 4 a.m. and 8 a.m.; and shelters for abused women, from 6 p.m. on March 20 to noon on the following day.

Other individuals whom some considered as part of the homeless population, were enumerated as part of regular census operations. These included people temporarily living doubled up with other families, as well as people with no other usual home living in transient sites, such as commercial campgrounds, maternity homes for unwed



mothers, and drug/alcohol abuse detoxification centers. Additional homeless individuals were included in the census, but their locations could not be separately identified. These included people in local jails and mental hospitals.

All jurisdictions of 50,000 or more were included in S-Night. The jurisdictions which did not respond included overlapping jurisdictions (such as counties and minor civil divisions) and many which were small towns unlikely to have had homeless individuals. The quality of the site lists provided by the jurisdictions varied. In most cases, the lists met the needs of enumerators searching for the locations. In some instances, however, descriptions indicated locations where homeless people could be found during the day but not at night.

The Census Bureau encouraged residents familiar with homeless individuals and the homeless themselves to apply as enumerators. This recruiting effort was particularly successful in larger cities.

For shelters, both long- and short-form ICR's were distributed. For street enumeration, only short-form ICR's were used. Those in shelters and at street locations were asked the basic population questions. Additional questions about social and economic characteristics were asked of a sample of people in shelters only.

Enumerators were instructed *not* to ask who was homeless; rather, they were told to count everyone (including children) staying overnight at the shelters, and everyone they saw on the street except the police, other individuals in uniforms, and people engaged in employment or obvious money-making activities other than begging and panhandling.

At both shelter and street sites, people found sleeping were not awakened to answer questions. Rather, the enumerator answered the sex and race questions by observation and estimated the person's age to the best of his or her ability. In shelters, administrative records and information from the shelter operator were used, when available, for people who were already asleep.

Initially, less than 1 percent of shelters refused to participate in the census count. By the end of the census period, most of those eventually cooperated and the number of refusals had been reduced to a few. For the final refusals, head counts and population characteristics were obtained by enumerators standing outside such shelters and counting people as they left in the morning.

The "street" count was restricted to individuals who were visible when the enumerator came to the open, public locations that had been identified by local jurisdictions. Homeless people who were well hidden, moving about, or in shelter and street locations other than those identified by the local governments were probably missed. The number missed will never be known, and the census itself provided no basis on which to estimate the number of such people missed.

The Census Bureau specifically excluded some street locations because of the potential danger to both census takers and people located there. Thus, the Census Bureau likely missed people living in cars and dumpsters, on

rooftops, and so forth. The count of people in open, public places was affected by many factors, including the extra efforts made to encourage people to go to shelters for S-Night, the weather (which was unusually cold in many parts of the country), the presence of the media, and distrust of the census. Analysts could not use the number of homeless people found on the street during the day to estimate the total size of the homeless population because the night-time situation was normally very different, since more homeless individuals were in shelters or very well hidden.

For both "Shelter-and-Street-Night" locations, the Census Bureau assumed that the usual home of those enumerated was in the block where they were found (shelter or street).

The S-Night operation replaced and expanded the 1980 Mission Night (M-Night) and Casual Count operations. These two operations were aimed at counting the population who reported having no usual residence. M-Night was conducted a week after Census Day (April 1, 1980). Enumerators visited hotels, motels, and similar places costing \$4 or less each night; missions, flophouses, local jails, and similar places at which the average length of stay was 30 days or less; and nonshelter locations, such as bus depots, train stations, and all-night movie theaters. Questions were asked of everyone, regardless of age. Enumerators conducted M-Night up to midnight on April 8, 1980, and returned the next morning to collect any forms completed after midnight.

The Casual Count operation lasted for approximately 2 weeks in May 1980 and concentrated on additional nonshelter locations, such as street corners, pool halls, and welfare and employment offices. Casual Count was conducted during the day only in selected large central cities. Only people who appeared to be at least 15 years of age were asked if they had been enumerated previously. Casual Count was actually a coverage improvement operation and was not specifically aimed at counting homeless persons living in the streets. Individuals were excluded if they said they had a usual home outside the city because it was not cost effective to check through individual questionnaires in another city to try to find the person.

**Limitations of the data**—Homeless people who were well hidden, moving about, or in locations enumerators did not visit were likely to be missed during S-Night. The number of people missed will never be known; thus, the 1990 census did not include a definitive count of America's total homeless population. However, the data gathered during S-Night did provide evidence about the relative differences among areas of the country. Other people were counted as part of regular census procedures.

Among the factors that probably affected the count of people in shelters and visible on the street were:

1. How well enumerators were trained and how well they followed procedures.

2. How well the lists of shelter and street locations that local governments provided to the Census Bureau reflected the actual places homeless people stayed at night.
3. Cities were encouraged to open temporary shelters for census night, and many did that and actively encouraged people to enter the shelters. Thus, people who might otherwise have been on the street were in shelters the night of March 20, and the ratio of shelter-to-street population could have been different than usual.
4. The weather, which was unusually cold in some parts of the country, could affect how likely people were to seek emergency shelter or to be more hidden than usual if they stayed outdoors.
5. The media occasionally interfered with the ability to do the count.
6. How homeless people perceived the census and whether they wanted to be counted or feared the census and hid from it.

**Editing and allocation**—In the field, questionnaires were reviewed for omissions and for certain inconsistencies by an enumerator. If necessary, a follow-up was made to obtain missing information or to correct inconsistencies. Information that remained missing following the completion of field operations was assigned (imputed) during the computer-editing process. See discussions under individual question headings.

### Similarities and Differences Between the 1990 and 1980 Censuses

**New items for 1990**—These included the following: Items 17c (total number of years in military service); 19 (mobility and self-care limitations); 24a (time of departure from home to go to work); 32g (pension income); H7b (meals included in rent (congregate housing)); H24b (monthly payment on second mortgages and home equity loans); H25 (monthly condominium fee); and H26 (mobile home costs).

**Essentially unchanged items**—Items that were the same or much the same in 1990 as in 1980 follow: Items 3 (sex); 6 (marital status); 8 (place of birth); 18 (work limitation and work prevention); 20 (children ever born); 21a (work status last week); 21b (actual hours worked last week); 25 (temporary absence from work); 26a (looking for work during last 4 weeks); 26b (availability to accept a job); 27 (year last worked); 28b (kind of business or industry); 28c (industry sector); 29 (occupation); 31 (work experience); 33 (total income in 1989); C2 (boarded-up housing units); H3 (number of rooms); H11 (complete kitchen facilities); H12

(telephone in unit); H15 (source of water); H16 (sewage disposal); H18 (condominium status); H1 (real estate taxes); H22 (fire, hazard, and flood insurance); H23a (mortgage status (existence of mortgage)); and H23c (real estate taxes included in mortgage payment).

**Revised items**—For the following 1990 questions, some wording changes were made between the two censuses: Items 2 (relationship); 4 (race); 5 (age); 7 (Hispanic origin); 9 (citizenship); 10 (year of entry); 11 (school enrollment); 12 (educational attainment); 13 (ancestry); 14 (residence 5 years ago); 15a and 15b (language spoken at home); 17 (veteran status); 17b (period of service); 22 (place of work); 23a (means of transportation to work); 23b (private vehicle occupancy); 24b (travel time); 28a (name of company, business, or other employer); 30 (class of worker); 32d (interest, dividend, net rental, and estate income); 32h (any other income sources); B (type of unit); C1 (vacancy status); H2 (type of building and units in structure); H4 (tenure); H5 (value screener); H6 (value of property); H7a (monthly rent); H8 (year moved in); H9 (number of bedrooms); H10 (complete plumbing facilities); H13 (vehicles available to household members); H14 (fuel used most in house heating); H17 (year built); H19 (farm residence); H23b (monthly mortgage payment (first mortgage)); H23d (fire, hazard, and flood insurance payment included in mortgage payment); and H24a (second mortgage or home equity loan status).

**1980 census items omitted in 1990**—The following items were included in 1980 but omitted in the 1990 census:

- Activity 5 years ago identified three types of activities a person might have participated in 5 years earlier—serving in the Armed Forces, attending college, or working at a job or business.
- “Did this person finish the highest grade (or year) attended?”
- Work disability, asking if a condition limited or prevented use of public transportation was dropped in 1990.

The 1990 questions on employment status (21a and 26) excluded number of weeks looking for work. The 1990 item 23a (private vehicle occupancy) omitted a question on detailed carpooling arrangements (whether drove alone, shared driving, drove others, or rode as a passenger).

The 1990 census dropped several structure questions asked in 1980. The 1980 100-percent question on number of living quarters at the address was replaced by a slightly modified version of the 1980 sample question on type of building and number of units in the structure. The definitional question on independent entrance to the living quarters also was dropped, as were sample questions on



Table 1. Comparison of Question Topics on the 1990 and 1980 Questionnaires

| Question number      | Topic or item   | 100-percent or sample (S) <sup>1</sup> |      | Question number      | Topic or item  | 100-percent or sample (S) <sup>1</sup> |      |
|----------------------|---|--|------|----------------------|--|--|------|
|                      |   | 1990                                   | 1980 |                      |  | 1990                                   | 1980 |
|                      | <b>POPULATION</b>   |  |      |                      | <b>HOUSING</b>   |  |      |
| 1                    | Name .....  | 100                                    | 100  | H1                   | Coverage questions <sup>2</sup> .....  | 100                                    | 100  |
| 2                    | Household relationship .....  | 100                                    | 100  | H2                   | Units in structure .....   | 100                                    | S    |
| 3                    | Sex .....   | 100                                    | 100  | H3                   | Number of rooms .....  | 100                                    | 100  |
| 4                    | Race .....  | 100                                    | 100  | H4                   | Tenure (owned or rented) .....   | 100                                    | 100  |
| 5                    | Age .....   | 100                                    | 100  | H5                   | Screening questions for value and rent (acreage and commercial establishment) .....          | 100                                    | 100  |
| 6                    | Marital status .....  | 100                                    | 100  |                      | Value of property .....  | 100                                    | 100  |
| 7                    | Spanish/Hispanic origin .....   | 100                                    | 100  |                      | Contract rent .....  | 100                                    | 100  |
| 8                    | Place of birth .....  | S                                      | S    | H6                   | Congregate housing (meals included in rent) .....  | 100                                    | -    |
| 9                    | Citizenship .....   | <sup>3</sup> S                         | S    | H7a                  | Vacancy status <sup>4</sup> .....  | 100                                    | 100  |
| 10                   | Year of entry .....   | S                                      | S    | H7b                  | Boarded-up status <sup>4</sup> .....   | 100                                    | 100  |
| 11                   | School enrollment and type .....  | S                                      | S    |                      | Duration of vacancy <sup>4</sup> .....   | 100                                    | 100  |
| 12                   | Educational attainment .....  | <sup>3</sup> S                         | S    | C1                   | Year householder moved into unit .....   | S                                      | S    |
| 13                   | Ancestry .....  | S                                      | S    | C2                   | Number of bedrooms .....   | S                                      | S    |
| 14                   | Residence 5 years ago .....   | S                                      | S    | D                    | Complete plumbing facilities .....   | <sup>3</sup> S                         | 100  |
| 15                   | Current language and ability to speak English .....                                     | S                                      | S    | H8                   | Complete kitchen facilities .....  | S                                      | S    |
| 16                   | Age screening question (items 17-33 are limited to persons 15 years old and over) ..... | S                                      | S    | H9                   | Telephone in unit .....  | S                                      | S    |
| 17a, b               | Veteran status and period of service .....  | <sup>3</sup> S                         | S    | H12                  | Automobiles, vans, or light trucks available .....   | S                                      | -    |
| 17c                  | Total years of military service .....   | S                                      | -    | H13                  | House heating fuel .....   | S                                      | S    |
| 18                   | Work disability .....   | S                                      | S    | H14                  | Source of water and method of sewage disposal .....  | S                                      | S    |
| 19                   | Mobility and self-care limitations .....  | S                                      | -    | H15, H16             | Year structure built .....   | S                                      | S    |
| 20                   | Children ever born .....  | S                                      | S    | H17                  | Condominium status .....   | S                                      | 100  |
| 21a                  | Work status last week .....   | S                                      | S    | H18                  | Farm residence status .....  | <sup>3</sup> S                         | S    |
| 25                   | Temporary absence from work .....   | S                                      | S    | H19                  | Cost of utilities and fuels (component of gross rent and selected monthly owner costs) ..... | S                                      | S    |
| 26                   | Employment status .....   | S                                      | S    | H20                  | Selected shelter costs for homeowners .....  | <sup>3</sup> S                         | S    |
| 21b                  | Hours worked last week .....  | S                                      | S    | H21 to H24           | Monthly condominium fee .....  | <sup>3</sup> S                         | S    |
| 22                   | Place of work .....   | S                                      | S    | H25                  | Mobile home cost .....   | <sup>3</sup> S                         | S    |
| 23a                  | Means of transportation to work .....   | S                                      | S    | H26                  | Persons in unit (household size) .....   | 100                                    | 100  |
| 23b                  | Private vehicle occupancy .....   | S                                      | S    | Derived <sup>5</sup> | Persons per room .....   | 100                                    | 100  |
| 24a                  | Departure time for work .....   | S                                      | -    | Derived <sup>5</sup> | Gross rent .....   | S                                      | S    |
| 24b                  | Travel time to work .....   | S                                      | S    | Derived <sup>5</sup> | Selected monthly owner costs .....   | <sup>3</sup> S                         | S    |
| 27                   | Year last worked .....  | S                                      | S    | Derived <sup>5</sup> | Access to unit (household size) .....  | -                                      | 100  |
| 28                   | Industry .....  | S                                      | S    |                      | Air-conditioning .....   | -                                      | S    |
| 29                   | Occupation .....  | S                                      | S    |                      | Automobiles available .....  | (See H13)                              | S    |
| 30                   | Class of worker .....   | S                                      | S    |                      | Number of bathrooms .....  | -                                      | S    |
| 31a, b               | Weeks worked last year .....  | S                                      | S    |                      | Fuels used for water heating and cooking .....   | -                                      | S    |
| 31c                  | Hours usually worked per week last year .....   | S                                      | S    |                      | Heating equipment .....  | -                                      | S    |
| 32                   | Income, by type .....   | <sup>3</sup> S                         | S    |                      | Number of living quarters at address .....   | -                                      | 100  |
| 33                   | Total income .....  | S                                      | S    |                      | Stories in structure and presence of elevator .....  | -                                      | S    |
| Derived <sup>5</sup> | Family size and household size .....  | 100                                    | 100  |                      | Vans or light trucks available .....   | (See H13)                              | S    |
| Derived <sup>5</sup> | Family type and household type .....  | 100                                    | 100  |                      |  |  |      |
| Derived <sup>5</sup> | Poverty status .....  | S                                      | S    |                      |  |  |      |
| Derived <sup>5</sup> | Type of group quarters .....  | S                                      | S    |                      |  |  |      |
|                      | Activity 5 years ago .....  | -                                      | S    |                      |  |  |      |
|                      | Carpooling arrangements .....   | -                                      | S    |                      |  |  |      |
|                      | Marital history .....   | -                                      | S    |                      |  |  |      |
|                      | Public transportation disability .....  | -                                      | S    |                      |  |  |      |
|                      | Weeks unemployed last year .....  | -                                      | S    |                      |  |  |      |

<sup>1</sup>"S" indicates sample subject covered only on the long-form questionnaire.

<sup>2</sup>These questions help ensure that the coverage of household members is complete.

<sup>3</sup>Significantly changed from 1980 version in concept or amount of detail.

<sup>4</sup>Determined by the enumerators. See "For Census Use" section of the questionnaire.

<sup>5</sup>"Derived" refers to items which did not appear on the questionnaire but were calculated by combining information from other items. For example, while no question specifically asks family size, family size can be determined from responses to the household-relationship question.

number of stories and presence of an elevator. The 1990 question 14 (fuels used) dropped questions on water-heating and cooking fuels. The 1990 questionnaire did not request air-conditioning availability and number of bathrooms.

### **Presentation of Individual Items**

Each questionnaire item discussed below will fall into one of four groupings: 100-percent population questions (those asked about everyone), sample population questions, 100-percent housing questions, and sample housing questions. In addition, a separate section covers poverty status, derived from answers to several population

questions. Each question (and accompanying instruction) appears as presented on the questionnaire. Likewise, the instructions to the respondents that followed the questions replicate those in the booklet ("Your Guide for the 1990 U.S. Census Form") that accompanied the form.

As mentioned earlier, followup enumerators had additional instructions in the *Questionnaire Reference Book*. Because these generally only rephrased or clarified the respondent's instructions, this discussion will mention them only when necessary to explain how the Census Bureau resolved certain special situations. Also, where relevant, this chapter will discuss variables derived from each question, clerical coding in the processing centers, and editing and allocation specifications.

100-PERCENT POPULATION QUESTIONS

Question 1. Name and Person Column

Page 1

The 1990 census must count every person at his or her "usual residence." This means the place where the person lives and sleeps most of the time.

**1a. List on the numbered lines below the name of each person living here on Sunday, April 1, including all persons staying here who have no other home. If EVERYONE at this address is staying here temporarily and usually lives somewhere else, follow the instructions given in question 1b below.**

**Include**

- Everyone who usually lives here such as family members, housemates and roommates, foster children, roomers, boarders, and live-in employees
- Persons who are temporarily away on a business trip, on vacation, or in a general hospital
- College students who stay here while attending college
- Persons in the Armed Forces who live here
- Newborn babies still in the hospital
- Children in boarding schools below the college level
- Persons who stay here most of the week while working even if they have a home somewhere else
- Persons with no other home who are staying here on April 1

**Do NOT include**

- Persons who usually live somewhere else
- Persons who are away in an institution such as a prison, mental hospital, or a nursing home
- College students who live somewhere else while attending college
- Persons in the Armed Forces who live somewhere else
- Persons who stay somewhere else most of the week while working

Print last name, first name, and middle initial for each person. Begin on line 1 with the household member (or one of the household members) in whose name this house or apartment is owned, being bought, or rented. If there is no such person, start on line 1 with any adult household member.

| LAST | FIRST | INITIAL | LAST | FIRST | INITIAL |
|------|-------|---------|------|-------|---------|
| 1    |       |         | 7    |       |         |
| 2    |       |         | 8    |       |         |
| 3    |       |         | 9    |       |         |
| 4    |       |         | 10   |       |         |
| 5    |       |         | 11   |       |         |
| 6    |       |         | 12   |       |         |

**1b. If EVERYONE is staying here only temporarily and usually lives somewhere else, list the name of each person on the numbered lines above, fill this circle  and print their usual address below. DO NOT PRINT THE ADDRESS LISTED ON THE FRONT COVER.**

House number \_\_\_\_\_ Street or road/Rural route and box number \_\_\_\_\_ Apartment number \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ ZIP Code \_\_\_\_\_

County or foreign country \_\_\_\_\_ Names of nearest intersecting streets or roads \_\_\_\_\_

**NOW PLEASE OPEN THE FLAP TO PAGE 2 AND ANSWER ALL QUESTIONS FOR THE FIRST 7 PEOPLE LISTED. USE A BLACK LEAD PENCIL ONLY.**

## Instructions

- 1a.** List everyone who lives at this address in question 1a. If you are not sure if you should list a person, see the rules on page 1 of the census form. If you are still not sure, answer as best you can and fill in "Yes" for question H1a or H1b, as appropriate.

If there are more than seven people in your household, please list all the persons in question 1a, complete the form for seven people, and mail it back in the enclosed envelope. A census taker will call to obtain the information for the additional persons.

- b.** If everyone listed in question 1a usually lives at another address(es), print the address(es) in 1b.

Names were collected in the census solely for identifying either a given record or a particular person for whom more information was needed. Names also were used to provide a safeguard against duplication. From the first census in 1790 through 1840, only the names of family heads were written on the schedules; beginning in 1850, the names of all individuals (except slaves) were entered. Names were not keyed or stored in computer files.

In 1990, as in 1980, page 1 of the questionnaire provided the respondent (or the enumerator) with space to list the name of each person who usually lived in the housing unit or who had no other home. The "Include" list and the "Exclude" list above this space provided guidelines for determining who should be counted at the address. These guidelines enabled the respondent to apply census residence rules when deciding whom to include or exclude from the list of individuals who usually lived in the housing unit.

In order to identify principal family groups, it was necessary to list an adult to whom all other household members, if any, were related.

| PERSON 1   |                |  |
|------------|----------------|--|
| Last name  |                |  |
| First name | Middle initial |  |

The 1990 questionnaires (both short and long) included seven "person columns." When respondents listed more than seven people on page 1, an enumerator called or visited the household to collect information on the remaining individuals.

**Coding**—None was required.

**Editing and allocation**—A "coverage edit" identified incomplete or inconsistent information on mail- and enumerator-returned questionnaires. It involved either an automated or clerical review and rejection (or markup) of questions or items dealing with who should be enumerated on a given questionnaire. This included the following: Item A (total persons, "For Census Use" box, p. 3); question 1a (listing of persons in the household, p. 1) and question 1b (whole household usual home elsewhere (WHUHE) indicator, p. 1); and question H1a (possible additions to the listed

persons, p. 3) and question H1b (possible deletions from the list, p. 3). The coverage edits were performed by computer in type 1 DO's and clerically in type 2/2A and type 3 DO's.

Four types of coverage edits were performed on 1990 questionnaires: Count edit, WHUHE edit, question H1a/H1b edit, and continuation-form edit. The count edit and WHUHE edit were performed on all questionnaires, both mail return and enumerator forms. The question H1a/H1b edit and the continuation-form edit were performed only on mail return questionnaires.

A questionnaire failed the count edit if the total number of people shown in item A was not equal to the number of data-defined individuals. The total in item A was the greater or common value of the number of person columns for which a name and/or an entry was supplied for at least one of the 100-percent population questions. A person was data-defined if there were entries for at least two of the 100-percent population questions.

A question failed the WHUHE edit if the circle in question 1b was marked and, if an address was listed, the address for the residence was different from the address on the questionnaire mailing label.

A mail return questionnaire failed the question H1a/H1b edit if either question H1a or H1b had the "Yes" response circle marked or a write-in entry was present.

A mail return questionnaire failed the continuation-form edit if the number of data-defined individuals was seven and the total number of persons shown in item A was seven with no continuation form.

## Question 2. Relationship

|   |  |
|---|--|
| <p><b>2. How is this person related to PERSON 1?</b></p> <p>Fill ONE circle for each person.</p> <p>If <b>Other relative</b> of person in column 1, fill circle and print exact relationship, such as mother-in-law, grandparent, son-in-law, niece, cousin, and so on.</p> | <p>If a <b>RELATIVE</b> of Person 1:</p> <p><input type="radio"/> Husband/wife      <input type="radio"/> Brother/sister</p> <p><input type="radio"/> Natural-born or adopted son/daughter      <input type="radio"/> Father/mother</p> <p><input type="radio"/> Stepson/stepdaughter      <input type="radio"/> Grandchild</p> <p><input type="radio"/> Other relative</p> <hr/> <p>If <b>NOT RELATED</b> to Person 1:</p> <p><input type="radio"/> Roomer, boarder, or foster child      <input type="radio"/> Unmarried partner</p> <p><input type="radio"/> Housemate, roommate      <input type="radio"/> Other nonrelative</p> |
|---|--|

## Instructions:

- 2.** Fill one circle to show how each person is related to the person in column 1. If **Other relative** of the person in column 1, print the exact relationship such as son-in-law, daughter-in-law, grandparent, nephew, niece, mother-in-law, father-in-law, cousin, and so on. If the **Stepson/stepdaughter** of the person in column 1 also has been legally adopted by the person in column 1, mark **Stepson/stepdaughter** but do not mark **Natural-born or adopted son/daughter**. In other words, **Stepson/stepdaughter** takes precedence over **Adopted son/daughter**.

Questions on the relationship of household members have been asked in each census since 1880. Much analysis of the population's social and economic characteristics was based on what this item revealed about living arrangements.

This question, asked for all individuals in housing units and completed in terms of the relationship of the particular person to the householder (person 1), instructed respondents to begin in column 1 with the household member (or one of the members) in whose name the home was owned or rented. If no such person occupied the home, any adult household member (15 years old and over) could be designated as person 1. Responses were divided into two groups, with a horizontal line to distinguish individuals related to person 1 from those not related.

For 1990, significant changes from 1980 included the following:

- The designation of the person listed at the top of column 1, to whom the relationships of other household members were to be specified, was simplified from being referred to as the "person in column 1" to "person 1."
- In the first block of categories (for relatives), the 1980 category for "Son/daughter" was split into two parts: "Natural or adopted son/daughter" and "Stepson/stepdaughter," in recognition of the increasing incidence of divorce and remarriage in the United States leading to a sharp rise in the number of stepfamilies.
- A new category for "Grandchild" was added to measure an additional component of three-generation families and to aid in the coding and tabulation of data for subfamilies within households.
- In the second response group (nonrelatives), the 1980 "Roomer, boarder" category was expanded in 1990 to include a specific reference to foster children. The instruction guide accompanying the 1980 questionnaire had directed respondents to mark this category for foster children living in the household, but analysts believed that specifically listing this group on the questionnaire would allow foster children to be identified more readily than in past censuses. One concern was that, without this addition, respondents erroneously might have included foster children in the new category for stepchildren.
- The 1980 category "Partner, roommate" was replaced with two: "Housemate, roommate" and "Unmarried partner," with the intention of sharpening the distinction between cohabiting couples (who marked "Unmarried partner") and other people living together ("Housemate, roommate").
- The 1980 response category for "Paid employee" was dropped from the 1990 questionnaire due to space considerations and the fact that the size of the category had declined over the past several decades to a very small number (only about 84,000 nationwide in 1980).

## Derived Variables

The person or individuals occupying a housing unit were termed a "household," and the reference person (person 1) was the "householder." Households were either "family" or "nonfamily." Family households had at least one person

related to person 1 by birth, marriage, or adoption. The family consisted of the householder and all persons related to him or her. Any other persons in the household not related to the householder by birth, marriage, or adoption were termed "nonrelatives." A nonfamily household contained a person living alone or with nonrelatives only. A household might include only one family (or none) but could also contain subfamilies (defined below) among the family members.

Families were further classified by family type as: (1) "married-couple family" when a household member was listed as "Husband/wife" of person 1; (2) "families with male householder, no wife present"; or (3) "families with female householder, no husband present."

The measure "persons in households" was calculated by dividing all occupants in a household, not just those related to the householder, by the number of occupied housing units. Figures for "persons in household" matched those for "persons in unit" in population and housing tabulations, respectively, based on 100-percent data. In sample tabulations, these figures sometimes differed because of the weighting process. "One-person households" and "persons living alone" were synonymous. "Persons per family" was obtained by dividing the number of persons in families by the total number of families. In cases where individuals in households and families were cross-classified by race or Hispanic origin, household members were classified by the race or Hispanic origin of the householder rather than the race or Hispanic origin of each individual.

Enumerators and telephone followup clerks received additional instructions in the *Questionnaire Reference Book*. They filled the "Husband/wife" circle for the person reported as the husband or wife of person 1. Other married couples might have resided in the household, but the entry for "Husband/wife" was filled only for the person reported as married to person 1.

Subfamilies were "families within a family." A subfamily was a family group of two or more persons related to the reference person but not including the reference person or his/her spouse. There were two types of subfamilies: married-couple and parent-child. A married-couple subfamily contained a married couple and their never-married children under 18 years of age, if any. Examples would include the son and daughter-in-law of person 1 and their never-married child (the grandchild of person 1) or the mother and father of person 1. A parent-child subfamily contained one parent (with no spouse present) and one or more never-married children under 18 years of age. Examples would include person 1's daughter and her never-married children under 18 years (grandchildren of person 1) or person 1's mother and a never-married brother or sister under 18 years of age.

A "Natural-born or adopted son/daughter" was either a son or daughter of person 1 by birth or adoption, regardless of the age of the child, if person 1 was not also the stepparent of the child. Foster children were included in the category "Roomer, boarder, or foster child."

A "Stepson/stepdaughter" was a son or daughter of person 1 through marriage but not by birth, regardless of the age of the child (excluding sons- and daughters-in-law). If the "Stepson/stepdaughter" of person 1 also was legally adopted by person 1, he or she was considered a "Stepson/stepdaughter," not a "Natural-born or adopted son/daughter." In other words, "Stepson/stepdaughter" took precedence over "Adopted son/daughter."

A "Father/mother" was either the parent by birth, the stepparent, or the adopted parent of person 1. A "Grandchild" was the grandson or granddaughter of person 1. A "Brother/sister" was either the brother or sister of person 1 by birth or adoption or the stepbrother or stepsister of person 1. "Other relative" included sons-, daughters-, brothers-, and sisters-in-law, as well as anyone else related to person 1, either by blood, marriage, or adoption (such as nephew, aunt, mother-in-law, cousin, grandparent, great-grandchild, etc.); and the exact relationship was printed in the space provided.

A "roomer, boarder, or foster child" was a roomer, boarder, lodger, or a foster child or foster adult dependent of person 1 and was not related to person 1. A "Housemate, roommate" was a person who was not related to person 1 but used common living quarters primarily to share expenses. An "Unmarried partner" was a person who was not related to person 1 but shared living quarters and had a close personal relationship with him or her. "Other nonrelative" referred to any other person who was not related to person 1 by blood, marriage, or adoption but could not be described by the given categories.

**Coding**—Only FOSDIC-circled answers to question 2 were tabulated. During sample processing, clerical staff checked the written entries for "Other relative" to see whether a circle other than "Other relative" should have been filled. For instance, for someone who wrote in "Stepfather" and marked "Other relative," the mark was removed and the "Father/mother" circle was filled instead. An ex-wife in the house was marked as "Other nonrelative."

The specific "Other relative" write-ins were coded into the following categories: Son- or daughter-in law, father- or mother-in-law, brother- or sister-in-law, nephew or niece, uncle or aunt, grandfather or grandmother, cousin, or any other relative (great-grandparent, etc.).

If there was no written entry and the "Other relative" circle was filled, processing staff had instructions to mark a code if they could determine relationship, or to code "any other relative" if they could not. In determining relationship, they were to use any information available on the questionnaire for all persons in the household.

If question 2 was not answered at all (i.e., no filled circle and no written entry), but the relationship appeared to be that of a relative, the proper circle was to be filled if the specific relationship could be determined. If no determination could be made as to whether the person was a relative or a nonrelative, no circle was filled, and no code was entered.

The coding staff's instructions contained clues for spotting subfamilies. For instance, when two or more of the referenced person's relatives had the same surname different from that of person 1, there was a good chance that this group of relatives was a subfamily. Combinations such as "son" and "daughter-in-law" in the same household signaled the presence of a subfamily. Answers to the age and marital-status questions also were used in determining the presence of subfamilies.

**Editing and allocation**—The consistency checks for questions 2 (relationship), 3 (sex), and 6 (marital status) were grouped into one category called the "edit of persons in the household." These procedures reconciled inconsistencies between each household member's relationship to the householder, marital status, sex, and age. The edit allocated values for inconsistently reported or missing values based on the values of the other variables. A list of procedures determined which variables to use in the allocation process based on the missing or inconsistent combinations. In general, the program established the householder first then, based on the assumption that this person was the householder, looked for inconsistencies or missing data in the other person's reported values.

The edit disallowed such improbable responses as two spouses, householders and spouses of the same sex, married individuals under 15 years of age, and children who were older than their parents. In some cases, missing values were allocated from the variable information. For example, if the householder was male and the spouse's sex was unreported, female could be allocated to the spouse.

If nine or more nonrelatives of the householder lived in the household, each person's relationship was blanked; the household was converted to group quarters (GQ) and processed as G in all edits.

### Question 3. Sex

|  |                            |                              |
|--|----------------------------|------------------------------|
| 3. Sex<br>Fill ONE circle for each person. | <input type="radio"/> Male | <input type="radio"/> Female |
|--|----------------------------|------------------------------|

**Instructions:** None.

As in every preceding census, the 1990 enumeration included a question on sex, asked for each person. These data were used in most cross-classifications of population characteristics.

To avoid offending a respondent, enumerators had instructions to complete this item (unlike others) by observation; or if not possible, they (or edit clerks) were to determine the person's sex from the name or relationship entry. If sex still remained unidentifiable, such as a person with a name common to both sexes, they made a direct inquiry. The 1990 inquiry was almost identical to the 1980 version.

**Coding**—None was required.

**Editing and allocation**—When sex was not reported, it was allocated from a previously processed record according to the person's age, marital status, and relationship to the householder. During the household edit that involved question 2, there was a consistency check of husband/wife responses to assure that the householder and spouse entries were for opposite sexes.

#### Question 4. Race

|   |  |
|---|--|
| <p><b>4. Race</b><br/>Fill ONE circle for the race that the person considers himself/herself to be.</p> <p>If <b>Indian (Amer.)</b>, print the name of the enrolled or principal tribe. →</p><br><p>If <b>Other Asian or Pacific Islander (API)</b>, print one group, for example: Hmong, Fijian, Laotian, Thai, Tongan, Pakistani, Cambodian, and so on →</p> <p>If <b>Other race</b>, print race. →</p> | <p><input type="radio"/> White</p> <p><input type="radio"/> Black or Negro</p> <p><input type="radio"/> Indian (Amer.) (Print the name of the enrolled or principal tribe.) →</p> <p><input type="radio"/> Eskimo</p> <p><input type="radio"/> Aleut</p> <p><b>Asian or Pacific Islander (API)</b></p> <p><input type="radio"/> Chinese      <input type="radio"/> Japanese</p> <p><input type="radio"/> Filipino      <input type="radio"/> Asian Indian</p> <p><input type="radio"/> Hawaiian      <input type="radio"/> Samoan</p> <p><input type="radio"/> Korean      <input type="radio"/> Guamanian</p> <p><input type="radio"/> Vietnamese      <input type="radio"/> Other API →</p> <p><input type="radio"/> Other race (Print race) →</p> |
|---|--|

#### Instructions:

- Fill ONE circle for the race each person considers himself/herself to be.
  - If you fill the **Indian (Amer.)** circle, print the name of the tribe or tribes in which the person is enrolled. If the person is not enrolled in a tribe, print the name of the principal tribe(s).
  - If you fill the **Other API** circle [under **Asian or Pacific Islander (API)**], **only** print the name of the group to which the person belongs. For example, the **Other API** category includes persons who identify as Burmese, Fijian, Hmong, Indonesian, Laotian, Bangladeshi, Pakistani, Tongan, Thai, Cambodian, Sri Lankan, and so on.
  - If you fill the **Other race** circle, be sure to print the name of the race.
  - If the person considers himself/herself to be **White, Black or Negro, Eskimo or Aleut**, fill one circle only. **Please do not print the race in the boxes.**
  - The **Black or Negro** category also includes persons who identify as African-American, Afro-American, Haitian, Jamaican, West Indian, Nigerian, and so on.
  - All persons, regardless of citizenship status, should answer this question.**

Inquiries on race have appeared in each census since 1790. The concept of race as currently used by the Census Bureau does not denote any clear-cut scientific definition of biological stock. In general, the data represent self-classification by people according to the race with which they identify themselves.

The 1980 version contained 15 response categories. In 1990, one more race category was added, "Other API [Asian/Pacific Islander]." The 1990 inquiry asked specifically for each person's "race" while the 1980 question omitted the word "Race" but used the lead-in, "Is this person—," to introduce the list of response categories. Space for two write-in responses appeared on the 1990 form: One box included the instruction, "If Indian (Amer.), print the name of the enrolled or principal tribe"; the other provided shared write-in space for "Other API" and "Other race." The 1990 question featured a listing of nine specific API population groupings beneath the heading "Asian or

Pacific Islander (API)" and carried an instruction for completing the item. The 1980 question contained one continuous listing that did not separate the API populations under a heading distinct from the other racial categories.

In the 1980 census, a relatively high proportion (20 percent) of American Indians did not report any tribal entry in the race item. Evaluation of the precensus tests indicated that changes made for the race item should improve the reporting of tribes in rural areas (especially on reservations) for the 1990 census. The results for urban areas were inconclusive. Also, the precensus tests indicated that there might be overreporting of the Cherokee tribe. An evaluation of 1980 census data showed overreporting of Cherokees in urban areas and areas where the number of American Indians was sparse.

**Coding**—The 1990 census was the first to undertake a 100-percent automated review, edit, and coding operation for written responses to the race item. The automated coding system used in 1990 aimed to reduce the potential for error associated with a clerical review. Specialists with a thorough knowledge of racial categories and classification systems reviewed, edited, coded, and resolved inconsistent or incomplete responses. The 1980 census involved only a limited clerical review of the race responses on the 100-percent forms, with a full clerical review only on the sample questionnaires.

Another major difference between the 1990 and preceding censuses was the handling of the write-in responses for the API populations. In addition to the nine API categories shown on the questionnaire, the 1990 census race item provided a new residual category "Other API" for API persons who did not select one of the listed groups. During the coding operation, write-in responses for "Other API" were reviewed, coded, and assigned to the appropriate classification. For example, in 1990, a write-in entry of Laotian, Thai, or Javanese received a distinct race code and was tabulated as Asian in the 100-percent operation; similarly, a write-in response of Tongan or Fijian was tabulated as "Pacific Islanders" in the 100-percent operation but reclassified as "Other API" in sample tabulations.

In the 1990 census, respondents sometimes did not fill in a circle or filled the "Other race" circle and wrote in a response, such as Arab, Polish, or African American in the shared write-in box for "Other race" and "Other API" responses. During the automated coding process, these responses were edited and assigned to the appropriate racial designation.

Pre-edit specifications for the 1990 automated coding system were used to code a special selection of write-ins to the race item from the 1990 census questionnaire. The special selection included groups such as "Moor," "Cajun," "Tunica," etc., that cut across major race groups. For example, Cajun could be classified or coded as "American Indian," "White," "Black," or "Other race." Another example, "Indian," could mean "American Indian," "West Indian (Black or Negro)," "East Indian," or "Asian Indian."



With the automated coding system, only one code could be used for any one specific write-in. The race question listed 16 categories. Only the "Indian (Amer.)," "Other API," and "Other race" groups required a write-in. In each case, an acceptable write-in took precedence over the FOSDIC. In cases of race responses in both write-in boxes, the first write-in was generally retained where the FOSDIC response was blank or "Indian (Amer.)." The second write-in was always preferred where the FOSDIC response was "Other race" and often preferred when it was "Other API." These decisions were based upon the proximity of the write-in lines to the appropriate FOSDIC circles. The procedures were designed to determine a single race response.

Specific instructions for coding a single write-in response differed, depending on whether the FOSDIC response was blank, "American Indian," "Other API," or "Other race."

**Editing and allocation**—Both pre-editing and editing procedures occurred. The household race was that of the first person in the household reporting a race. Four categories of race were used: (1) Not reported, (2) White, (3) Black, and (4) other. If no person in the household reported race, the household was substituted using only the household size. Completely blank one- to seven-person households were substituted using the same household-size units. In eight-plus-person households, the units were assumed to have seven persons before substitution took place.

Whenever possible, missing values for race were allocated from the races provided by members of the same household. The procedures attempted to allocate the race from a donor with the closest possible relationship to the recipient.

The race and age pre-edits for group quarters (GQ) were basically identical to the household procedures, except that the GQ race data were captured by keying rather than by FOSDIC. An edit of persons in GQ's was performed to reconcile inconsistencies in the GQ code, relationship, age, and sex. These procedures were considerably more detailed than those for households. The edit disallowed improbable responses such as inmates of noninstitutional GQ's, females in male-only GQ's, and age violations based on the GQ age restrictions.

### Question 5. Age and Year of Birth

|  |             |                  |
|--|-------------|------------------|
| <p>5. Age and year of birth</p> <p>a. Print each person's age at last birthday. Fill in the matching circle below each box.</p> <p>b. Print each person's year of birth and fill the matching circle below each box.</p> | a. Age      | b. Year of birth |
|  | 0 ○ 0 ○ 0 ○ | 1 ● 8 ○ 0 ○ 0 ○  |
|  | 1 ○ 1 ○ 1 ○ | 9 ○ 1 ○ 1 ○      |
|  | 2 ○ 2 ○     | 2 ○ 2 ○          |
|  | 3 ○ 3 ○     | 3 ○ 3 ○          |
|  | 4 ○ 4 ○     | 4 ○ 4 ○          |
|  | 5 ○ 5 ○     | 5 ○ 5 ○          |
|  | 6 ○ 6 ○     | 6 ○ 6 ○          |
|  | 7 ○ 7 ○     | 7 ○ 7 ○          |
|  | 8 ○ 8 ○     | 8 ○ 8 ○          |
| 9 ○ 9 ○  | 9 ○ 9 ○     |                  |

### Instructions:

- Print age at last birthday in the space provided (print "00" for babies less than 1 year old). Fill in the matching circle below each box. Also, print year of birth in the space provided. Then fill in the matching circle below each box. For an illustration of how to complete question 5, see the **Example** on page 2 of this guide.

An inquiry on age has been a part of the census, in varying forms, since 1790. In the first census, age was used only to divide free White males into two groups—those 16 years old and over and those under 16. The age categories were expanded in subsequent enumerations, first as ranges and then, in 1850, as single years. The question was asked in terms of "age at last birthday," with those under 1 year to be entered as fractions (age in months divided by 12). Variation from this pattern began in 1890; the question to date may be outlined as follows (the changes in Census Day affecting comparability):

| Year | Census Day | Asked  | Additional Detail |
|------|------------|--|-------------------|
| 1890 | June 1     | Age at nearest birthday                          | Under 1 year old  |
| 1900 | June 1     | Age, month and year of birth                     | 1                 |
| 1910 | Apr. 15    | Age at last birthday                             | 2                 |
| 1920 | Jan. 1     | Age at last birthday                             | 5                 |
| 1930 | Apr. 1     | Age at last birthday                             | 5                 |
| 1940 | Apr. 1     | Age at last birthday                             | 1                 |
| 1950 | Apr. 1     | Age at last birthday                             | 1                 |
| 1960 | Apr. 1     | Quarter of year in which birth occurred and year |                   |
| 1970 | Apr. 1     | Age, month and year of birth                     |                   |
| 1980 | Apr. 1     | Age, month, year, and coded quarter of birth     |                   |
| 1990 | Apr. 1     | Age and year of birth                            |                   |

This question was asked for all persons. The age classification was based on the age of the person at his/her last birthday, that is, the number of completed years from birth to Census Day (April 1 of the census year).

The 1990 age question asked the respondent to print his/her age at last birthday in the space provided (print "00" for babies less than 1 year old) and year of birth, then to fill in the matching circle below each box. These circles were interpreted by computer, which then calculated the respondent's age by subtracting these dates from Census Day. The written-in age and year were used by field office personnel to complete any missing or incorrectly filled circles before the forms were read by machine.

**Coding**—None was required.

**Editing and allocation**—Both pre-editing and editing procedures were used to assess consistency. The pre-edit allocated a value of age (5a) when inconsistencies were detected between the year of birth (item 5b) and age reported. If possible, missing age values were allocated

from the year of birth. Only the century portion of the year-of-birth responses was adjusted based on the age provided; missing year-of-birth values were not allocated or substituted.

Missing values for age were handled by a hot-deck matrix. Several matrices were used to determine age, depending on the relationship of the person with a missing age to the other persons in the household with reported age values. Most of the matrices provided an age difference (positive or negative) added to the age of a person in the unit with a known relationship to the recipient. For example, suppose the husband and the wife had missing ages but a son's or daughter's age was provided. The procedure first determined an age for the wife from the child by taking the difference between the reported ages of a wife and child in a similar household and adding it to the age of the child in the missing household. The husband's age would then be determined from the wife's in a similar manner.

If both age and year of birth were completely blank or meaningless, processing staff considered the response as blank and sent the record on to the household edits. Age was considered blank or meaningless if (a) it was completely blank, (b) only the middle digit was blank, (c) only the middle digit was present, (d) only the left digit was filled, or (e) age was greater than 114 years. Year of birth was considered blank or meaningless if it was completely blank, either the decade or ending year was blank, or the year of birth was not 1876 to 1990.

The remaining data were acceptable. In addition to perfect within-range responses to either item, not both, acceptable data included the following: (a) If only the rightmost digit of item 5a was filled, age was allocated that value; (b) if only the leftmost or rightmost digit was blank, age was allocated the value of the remaining two digits; and (c) in all cases where 5b was missing only the century of birth.

The same procedures were used on all individuals in households and group quarters. For the household universe, the procedures were done prior to the edit of people in households. For the group-quarters universe, a simplified version of the procedures was done as the first step of the edit of people in group quarters. Age only remained a part of a person's permanent record.

## Question 6. Marital Status

|  |   |
|--|---|
| <p><b>6. Marital status</b><br/>Fill ONE circle for each person.</p> | <p><input type="radio"/> Now married      <input type="radio"/> Separated<br/> <input type="radio"/> Widowed            <input type="radio"/> Never married<br/> <input type="radio"/> Divorced</p> |
|--|---|

### Instructions:

6. If the person's only marriage was annulled, mark **Never married**.

A question on marital status has appeared in all censuses since 1880, usually as "Single, married, widowed, or divorced?" From 1850 through 1890, the census asked

whether the person had married during the previous year. The category "Separated" was added in 1950 when the term "Single" was changed to "Never married," bringing the question to its present form. Experience had indicated a tendency of some formerly married respondents to classify themselves as "Single."

Marital status for individuals 14 and over are available back to 1890, but starting in 1980, they are published only for people 15 and over.

**Coding**—None was required.

**Editing and allocation**—As in 1980, "Never married" was the only acceptable response for anyone under 15. Any other entry was made "never married" by the computer. For individuals 15 years of age or older, the marital-status and relationship (item 2) entries for the person in question were compared with those for the householder. If the relationship was "husband" or "wife," the marital-status entry in both cases had to be "Now married"; if not, it was edited to conform. When marital status was not reported, it was allocated from a previously processed household with similar characteristics according to the relationship to the householder and the sex and age of the person.

In group quarters, all individuals under 15 years old were classified automatically as "Never married"; any others without responses were allocated a marital status from a matrix of previously reported people.

## Question 7. Spanish/Hispanic Origin

|  |   |
|--|---|
| <p><b>7. Is this person of Spanish/Hispanic origin?</b><br/>Fill ONE circle for each person.</p> | <p><input type="radio"/> No (not Spanish/Hispanic)<br/> <input type="radio"/> Yes, Mexican, Mexican-Am., Chicano<br/> <input type="radio"/> Yes, Puerto Rican<br/> <input type="radio"/> Yes, Cuban<br/> <input type="radio"/> Yes, other Spanish/Hispanic<br/>         (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.)</p> |
| <p>If Yes, other Spanish/Hispanic, print one group.</p>  | <p>_____</p>  |

### Instructions:

7. A person is of Spanish/Hispanic origin if the person's origin (ancestry) is Mexican, Mexican-Am., Chicano, Puerto Rican, Cuban, Argentinean, Colombian, Costa Rican, Dominican, Ecuadoran, Guatemalan, Honduran, Nicaraguan, Peruvian, Salvadoran, from other Spanish-speaking countries of the Caribbean or Central or South America, or from Spain.

If you fill the **Yes, other Spanish/Hispanic** circle, print one group.

A person who is not of Spanish/Hispanic origin should answer this question by filling the **No (not Spanish/Hispanic)** circle. Note that the term "**Mexican-Am.**" refers only to persons of Mexican origin or ancestry.

**All persons, regardless of citizenship status, should answer this question.**

The 1980 census marked the first time that Spanish/Hispanic origin was asked on a 100-percent basis. In 1970, a similar question was asked of only a 5-percent sample of the population. In 1990, this question was asked of all persons. Persons of Spanish/Hispanic origin or descent were those who classified themselves in one of the specific Spanish/Hispanic origin response categories listed on the questionnaire—Mexican, Puerto Rican, or Cuban—as well as those who indicated

they were of "other Spanish/Hispanic origin." Individuals reporting "other Spanish/Hispanic" were those who trace their origin to other Spanish-speaking countries of Central or South America, Spain, and the Dominican Republic, or persons identifying themselves generally as Spanish, Spanish American, Hispano, Hispanic, Latino, etc. For 1980 and 1990, Spanish/Hispanic origin and race information was collected in separate questions; thus, persons of Spanish/Hispanic origin could be of any race although virtually all selected the "White" and "Other race" categories.

The 1990 version of the Spanish/Hispanic origin question was modified from the 1980 question. For instance, "Fill one circle" was changed to "Fill ONE circle for each person," and a write-in box and examples were added to the "Yes, other Spanish/Hispanic" response category. On the sample forms, the write-in responses were coded to provide information on 17 additional countries of origin and several other categories of Spanish/Hispanic origin not previously available.

The 1990 and 1980 censuses differed from the 1970 census in the way in which individuals of Spanish/Hispanic origin who reported their race as "other race" were categorized. Many of these people provided a write-in entry such as Mexican, Venezuelan, or Latino in the race question. These entries were classified as "Other race" or "Other" in the 1990 and 1980 censuses respectively. In the 1970 census, however, most of the persons who identified themselves as Spanish/Hispanic in the race question were categorized as "White."

**Editing and allocation**—Missing responses for Spanish/Hispanic origin were allocated in a similar manner as race; however, race also was used in the allocation process. The computer program allocated Spanish/Hispanic origin based on a Spanish/Hispanic write-in entry if one was provided in the person's "Other race" category. If the program found a Spanish/Hispanic entry in the race question, it coded the write-in with a specified matrix (cold-deck) and assigned it to the person. If a race write-in was not provided, the origin was assigned from one of the other household members with the closest relationship to the recipient. Otherwise, the computer assigned an origin from a second specified hot-deck matrix.

There were sizable differences between sample data and 100-percent data because sample processing included additional edits not included in the 100-percent processing. Unlike the sample processing, the 100-percent procedure did not have coded write-in Spanish/Hispanic origin responses to determine the origin of persons who did not check a response category. If a write-in response was unavailable during sample processing, the program determined the origin of a person from the response to the place-of-birth question. If the place of birth was a Spanish-speaking country, it was used to assign a person's origin. If the place of birth was not a Hispanic country, then the first ancestry

response was checked for the presence of a Spanish/Hispanic response. If the first ancestry was Hispanic, then that was used to assign a Spanish/Hispanic origin code; if not, the second ancestry response was checked and used in a similar fashion. If neither ancestry response was Hispanic but the language spoken at home was "Spanish," a Spanish/Hispanic origin was allocated for that person; or the origin was assigned from one of the other household members with the closest relationship to the recipient. Otherwise, origin was assigned by a second specified hot-deck matrix.

## SAMPLE POPULATION INQUIRIES

### Question 8. Place of Birth

8. In what U.S. State or foreign country was this person born? →

(Name of State or foreign country; or Puerto Rico, Guam, etc.)

### Instructions:

8. *For persons born in the United States:*  
Print the name of the State in which this person was born. If the person was born in Washington, D.C., print District of Columbia. If the person was born in a U.S. territory or commonwealth, print Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, or Northern Marianas.
- For persons born outside the United States:*  
Print the name of the foreign country or area where the person was born. Use current boundaries, not boundaries at the time of the person's birth. Specify whether Northern Ireland or the Republic of Ireland (Eire); East or West Germany; North or South Korea; England, Scotland, or Wales (not Great Britain or United Kingdom). Specify the particular country or island in the Caribbean (not, for example, West Indies).

Data on place of birth have been collected in the census since 1850. These data have been used to classify the population of the United States into two major categories, native and foreign born. "Native" included persons born in the United States, the Commonwealth of Puerto Rico, and other outlying areas (including Guam, the U.S. Virgin Islands, American Samoa, and the Commonwealth of the Northern Mariana Islands), and individuals born in a foreign country or at sea but having at least one American parent. "Foreign born" included individuals not classified as "natives."

The 1960, 1970, and 1980 censuses based place of birth in the State of residence of the mother rather than the location of the hospital, if different, as more appropriate for calculating estimates of population change for States. Evaluation studies of 1970 and 1980 census data demonstrated that this instruction was generally either ignored or misunderstood. Since the hospital and the mother's residence are in the same State for most births, this change, at most, may have had a slight effect on State-of-birth data for large metropolitan areas that straddled State lines.

**Coding**—Place-of-birth coding required matching the responses to the State and Foreign Country File (SFCF) and attaching the geographic code. The SFCF contained (1) the names and abbreviations of each State, the District of Columbia, Puerto Rico, and the outlying areas of the United States; and (2) the official names, alternate names, and abbreviations of foreign countries and selected foreign city, state, county, and regional names.

Once the write-in response was keyed, it was matched to the SFCF in a machine-coding operation; the responses did not have to match a reference file entry exactly. The coding algorithm allowed for equivocations, such as using soundex values of letters (for example, m=n, f=ph, etc.) and reversing consecutive letter combinations (ie=ei). Each equivocation was assigned a numeric value or confidence level, with exact matches receiving the best score or highest confidence. The responses had to match a reference file entry with a high level of confidence in order for the machine code to be accepted. Nearly 98 percent of the place-of-birth responses were matched with an acceptable confidence during machine coding.

The remaining 2 percent of responses were coded in a computer-assisted clerical coding (CACC) operation. Clerks used an interactive computer system to select reference file entries that they thought best matched the responses, then the computer automatically assigned the codes associated with that geographic entity. The CACC operation work units included a three-way independent quality control sample of the responses requiring clerical coding and a quality control sample of the responses that were machine coded. The CACC operation included a referral coding unit that used paper reference materials to code names not included in the reference files.

**Editing and allocation**—Individuals for whom place of birth was not reported were assigned the birthplace of another family member or were allocated the response of another person with similar characteristics. People allocated as foreign born were not assigned a specific country of birth but were classified as "Born abroad, country not specified." When information on place of birth was not reported, nativity was assigned on the basis of answers to the citizenship question (9) and other characteristics.

Nonresponse was allocated in a similar manner in 1980; however, prior to 1980 nonresponse to the place of birth question was not allocated. Prior to the 1970 census, individuals not reporting place of birth were generally classified as "natives."

## Question 9. Citizenship

### 9. Is this person a CITIZEN of the United States?

- Yes, born in the United States — Skip to 11
- Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas
- Yes, born abroad of American parent or parents
- Yes, U.S. citizen by naturalization
- No, not a citizen of the United States

## Instructions:

9. A person should fill the **Yes, U.S. citizen by naturalization** circle only if he/she has completed the naturalization process and is now a United States citizen. If the person was born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas, he/she should fill the **Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas** circle. If the person was born outside the United States (or at sea) and has at least one American parent, he/she should fill the **Yes, born abroad of American parent or parents** circle.

An inquiry on citizenship appeared in the decennial censuses of 1820 and 1830, in 1870 (for males 21 years of age and over), and since 1890, except 1960. Under special arrangements with their respective governments, the 1960 100-percent questionnaires used in New York City and Puerto Rico included a question on citizenship, and results were tabulated only for those areas.

Information on citizenship was used to classify the population into citizens and noncitizens of the United States. In 1990, U.S. citizens were classified further into four subcategories, the first three of which included citizens at birth—individuals born in the United States; those born in the Commonwealth of Puerto Rico, Guam, the U.S. Virgin Islands, or the Commonwealth of the Northern Mariana Islands; and those born abroad of American parents. The fourth subcategory consisted of naturalized citizens—people who obtained U.S. citizenship through the judicial system.

The 1980 version presented this question as the first of a two-part inquiry that asked, "Is this person a naturalized citizen of the United States?" It was directed only to individuals who reported their place of birth as a foreign country in question 8. To emphasize that limitation, a lead-in to the citizenship question read, "If this person was born in a foreign country—." Despite the lead-in, however, analysis of 1980 census returns indicated that 22 percent of people who entered a U.S. State in the birthplace question (11) reported themselves as "Naturalized citizens" in the citizenship question (12). The erroneous entries required a substantial amount of editing. In addition, a small number of people reported themselves both as "Born abroad of American parents" and "Naturalized citizens." These examples of misreporting suggested that many respondents apparently did not follow the instructions that only persons born in foreign countries should answer the question.

**Coding**—No coding was necessary for question 9.

**Editing and allocation**—The computer first compared responses to this question with those to question 8 (place of birth). If the person was born in the United States, Puerto Rico, or a U.S. outlying area, the correct response to question 9 was filled if necessary. Remaining blanks were filled based upon the response for parents within the same household, or failing that, based on the response for the last processed person with the same period of immigration and country of birth.

## Question 10. Year of Entry

10. When did this person come to the United States to stay?

- 1987 to 1990   1970 to 1974  
 1985 or 1986  1965 to 1969  
 1982 to 1984  1960 to 1964  
 1980 or 1981  1950 to 1959  
 1975 to 1979  Before 1950

### Instructions:

10. If the person has entered the United States (that is, the 50 states and the District of Columbia) more than once, fill the circle for the latest year he/she came to stay.

This question asked respondents born outside the United States to report the interval that included the year in which they came to the country to stay. The chief revision to the 1980 question for 1990 involved expanding the question to include year of "entry" for citizens born in Puerto Rico or an outlying area and modifying the length of the response intervals to correspond more closely to program and legislative needs affected by waves of recent immigration to this country and with the year of the census.

The 1988 dress rehearsal (see ch. 2) and the 1990 census had 10 response categories of varying interval lengths, used 2- and 3-year intervals for most recent years and "Before 1950" for the earliest response. The last category was retained so that data from the 1980 census question could be compared with 1990 census results.

**Coding**—No coding was necessary for question 10.

**Editing and allocation**—The computer checked for inconsistencies between questions 10 and 5 (age); for example, someone under 5 years of age on Census Day could not have entered the United States in 1985. Blanks in question 10 were allocated based on the response for the last processed person with the same race and within the same age interval.

## Questions 11 and 12. Education

The 1990 census gathered two basic types of statistics on education—school enrollment and educational attainment (in terms of grade level completed and degree received). Since 1950, the census has provided data for education on a sample basis. Enrollment data have been collected in each census since 1850; items on schooling completed were first collected in 1940 and replaced a literacy question asked from 1840 to 1930.

## Question 11. School Enrollment

11. At any time since February 1, 1990, has this person attended regular school or college?

Include only nursery school, kindergarten, elementary school, and schooling which leads to a high school diploma or a college degree.

- No, has not attended since February 1  
 Yes, public school, public college  
 Yes, private school, private college

### Instructions:

11. Do not include enrollment in a trade or business school, company training, or tutoring unless the course would be accepted for credit at a regular elementary school, high school, or college.

A *public school* is any school or college that is controlled and supported primarily by a local, county, State, or Federal Government. Schools are private if supported and controlled primarily by religious organizations or other private groups.

School enrollment questions have been in the census since 1840; grade attended was first available in 1940; type of school (public/private) was first asked in 1960. The 1980 and 1970 questions included two response categories for nonpublic school ("private, church-related" and "private, not church-related" in 1980 and "parochial" and "other private" in 1970). The 1990 version differed in that it did not differentiate between types of private schools. Also, the word "Count" was replaced by "Include only" for levels of school.

**Coding**—No coding was necessary for item 11.

**Editing and allocation**—Individuals without a response to the school enrollment question were assigned the enrollment status and type of school of a person with the same age (5), race (4), Hispanic origin (7), and, at older ages, sex (3), who resided in the same or a nearby area.

**Enrollment levels**—Level of enrollment was determined by the combination of the school enrollment and educational attainment items. People who were enrolled and completed nursery school or less were classified as enrolled in "preprimary school," which included kindergarten. Similarly, enrolled individuals who had completed at least kindergarten but not high school were classified as enrolled in elementary or high school. Enrolled individuals who had completed high school or some college or had received a post-secondary degree were classified as enrolled in college. Enrolled respondents completing the 12th grade but receiving no diploma were classified as enrolled in high school.



Because the attainment item included highest levels completed and highest degree, exact grade of enrollment, as shown in previous years, could not be produced. From 1950 through 1980, educational attainment was derived from two items, "highest grade or year ever attended" and "completed the grade," and the grade in which enrolled was the highest grade attended. To improve the usefulness of the attainment data, enrollment detail was reduced.

Since the 1950 census, college students were enumerated where they lived while attending college; in earlier censuses, they generally were enumerated at their parental homes. This change should not have affected the comparability of national figures on college enrollment since 1940; however, it may have affected the comparability over time of enrollment figures at subnational levels.

## Question 12. Educational Attainment

### 12. How much school has this person COMPLETED?

Fill ONE circle for the highest level COMPLETED or degree RECEIVED. If currently enrolled, mark the level of previous grade attended or highest degree received.

- No school completed
- Nursery school
- Kindergarten
- 1st, 2nd, 3rd, or 4th grade
- 5th, 6th, 7th, or 8th grade
- 9th grade
- 10th grade
- 11th grade
- 12th grade, NO DIPLOMA
- HIGH SCHOOL GRADUATE - high school DIPLOMA or the equivalent (For example: GED)
- Some college but no degree
- Associate degree in college - Occupational program
- Associate degree in college - Academic program
- Bachelor's degree (For example: BA, AB, BS)
- Master's degree (For example: MA, MS, MEng, MEd, MSW, MBA)
- Professional school degree (For example: MD, DDS, DVM, LLB, JD)
- Doctorate degree (For example: PhD, EdD)

### Instructions:

12. Mark the category for the highest grade or level of schooling the person has successfully completed or the highest degree the person received. If the person is enrolled in school, mark the category containing the highest grade completed (the grade previous to the grade in which enrolled). Schooling completed in foreign or ungraded schools should be reported as the equivalent level of schooling in the regular American school system.

Persons who completed high school by passing an equivalency test, such as the General Educational Development (GED) examination, and did not attend college, should fill the circle for high school graduate.

Do not include vocational certificates or diplomas from vocational, trade, or business schools or colleges unless they were college level associate degrees or higher.

Some examples of professional school degrees include medicine, dentistry, chiropractic, optometry, osteopathic medicine, pharmacy, podiatry, veterinary medicine, law, and theology. Do not include barber school, cosmetology, or other training for a specific trade.

Do not include honorary degrees awarded by colleges and universities to individuals for their accomplishments. Include only "earned" degrees.

The 1990 educational attainment question differed from the question asked from 1940 to 1980. More than a revision, the 1990 question changed the focus from years of school to degree. The earlier question asked for "... highest grade or year completed" (from 1950 to 1980, it was in two parts: "highest...attended" and "did you complete...") whereas in 1990 the question asked for "... highest level COMPLETED or degree RECEIVED." The change in concept from years to degrees was the first major change since 1940. The 1990 item identified the highest credential the person had earned rather than inferring possession of credentials or degrees based on the years completed. The response categories were changed because there was evidence that the comparability between years of school and degrees had deteriorated over time. The comparability between "completed four years of college," "completed the senior year of college," and "college graduate" had become less clear, as some individuals who completed 4 years of college have not received a bachelors degree. With increased numbers of people earning other post-secondary degrees (e.g., associate, masters, professional, and doctorate), the numbers of respondents with those degrees could not be approximated from years of college. Comparison with data for earlier years is possible for major degrees and below the college level but should be made with caution.

In 1990, the response choice "No school completed" was the first category listed, resulting in a consistent principle of listing educational attainments in ascending order, ranging from no school attended to the highest degree a person could earn. A similar response choice in 1980 "Never attended school" followed the college-year attended.

**Coding**—No coding was necessary for item 12.

**Editing and allocation**—Individuals for whom educational attainment was not reported were assigned the attainment of a person of the same age, race or Spanish origin, and sex who resided in the same or a nearby area. Entries for respondents for whom more than one circle was filled were edited to the highest level or degree reported. In the 1960 and subsequent census, people for whom educational attainment was not reported were assigned the same attainment level as a similar person living in the same or a nearby area. In the 1940 and 1950 censuses, educational attainment was not allocated.

## Question 13. Ancestry

### 13. What is this person's ancestry or ethnic origin?

(See instruction guide for further information.)

(For example: German, Italian, Afro-Amer., Croatian, Cape Verdean, Dominican, Ecuadoran, Haitian, Cajun, French Canadian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Irish, Polish, Slovak, Taiwanese, Thai, Ukrainian, etc.)

## Instructions:

- 13.** Print the ancestry group. Ancestry refers to the person's ethnic origin or descent, "roots," or heritage. Ancestry also may refer to the country of birth of the person or the person's parents or ancestors before their arrival in the United States. All persons, regardless of citizenship status, should answer this question.

Persons who have more than one origin and cannot identify with a single ancestry group may report two ancestry groups (for example, German-Irish).

Be specific. For example, print whether West Indian, Asian Indian, or American Indian. West Indian includes persons whose ancestors came from Jamaica, Trinidad, Haiti, etc. Distinguish Cape Verdean from Portuguese; French Canadian from Canadian; and Dominican Republic from Dominica Island.

A religious group should not be reported as a person's ancestry.

The 1980 census marked the first time that a general question on ancestry (ethnicity) was asked in a decennial census. The inquiry replaced items in earlier censuses dating back to 1880 that covered the country of birth of a person's parents; that information was used in combination with the person's own place of birth to identify first- and second-generation Americans (the "foreign stock" population). Thus, 1990 and 1980 ancestry data and foreign-stock information from prior censuses are not directly comparable.

This item, based on self-identification, was open ended (respondents wrote in their answers). Ancestry referred to a person's ethnic origin or descent, "roots," or heritage. It also referred to the country of birth of the person or the person's parents or ancestors before their arrival in the United States. Individuals could report their ancestry regardless of the number of generations they were removed from their ancestors' places of origin. Furthermore, responses to the ancestry question reflected the ethnic group(s) with which each person identified and not necessarily the degree of attachment they had with the particular group(s).

**Coding**—The Census Bureau coded the responses for ancestry (see app. 14C, figure 4) through an automated review, edit, and coding operation. The automated coding system used in 1990 greatly reduced the potential for error associated with a clerical review. Subject-matter specialists used a coding list of more than 1,000 categories to assign numeric codes to responses to the open-ended write-in ancestry question. The 1990 code list reflected the results of the agency's own research and consultations with a number of ethnic experts. Many decisions concerning the classification of responses affected the grouping of the tabulated data. For example, the "Assyrian" category included both responses of "Assyrian" and "Chaldean."

The ancestry question allowed respondents to report one or more ancestry groups. While a large number of respondents listed a single ancestry, the majority of answers

included more than one ethnic entry. Generally, only the first two responses reported were coded in 1990. If a response indicated dual ancestry, for example, Irish-English, the person was assigned two codes, in this case, one for Irish and another for English. However, in certain cases, multiple responses such as "French Canadian," "Scotch-Irish," "Greek Cypriote," and "Black Dutch" were assigned a single code reflecting their status as unique groups. If a person reported one of these unique groups in addition to another group, for example, "Scotch-Irish English," resulting in three terms, that person received one code for the unique group ("Scotch-Irish") and another for the remaining group ("English"). If a person reported "English Irish French," only English and Irish were coded. Certain combinations of ancestries where the ancestry group was part of another, such as "German-Bavarian," the responses were coded as a single ancestry using the smaller group ("Bavarian"). Also, responses such as "Polish-American" or "Italian-American" were coded and tabulated as a single entry ("Polish" or "Italian"). (The 1980 procedures attempted to code a third ancestry for selected triple-ancestry responses.)

The census accepted "American" as a unique ethnicity, whether it appeared alone or with an ambiguous response. If "American" with State name(s) was reported, the State name only was coded. If the respondent listed any other ethnic identity such as "Italian American," generally, the "American" portion of the response was not coded. However, distinct groups such as "American Indian," "Mexican American," and "African American" were coded and identified separately because they represented groups who considered themselves different from those who reported as "Indian," "Mexican," or "African," respectively.

When respondents provided an ethnic identity, for example, an uncodeable or unintelligible response such as "multinational," "adopted," or "I have no idea," the answer was included in a residual or nonresponse category.

Unlike other census questions, there was no imputation for nonresponse to the ancestry question.

**Editing and allocation**—There were both pre-editing and editing operations. In the pre-edit, blanks were changed to "not reported." Where more than one ancestry group was reported, only the first two were used. Entries for religious groups, such as Jewish, Moslem, Protestant, etc., were coded in a general "religious response" category but were not tabulated individually.

In the edit phase, the computer reviewed the entries in question 13 for the entire household to make certain that the codes were legitimate (codes within some ranges were not used). There was no allocation for nonresponse in the ancestry question.



## Question 14. Residence 5 Years Ago

**14a. Did this person live in this house or apartment 5 years ago (on April 1, 1985)?**

Born after April 1, 1985 — *Go to questions for the next person*

Yes — *Skip to 15a*

No

---

**b. Where did this person live 5 years ago (on April 1, 1985)?**

**(1) Name of U.S. State or foreign country** →

\_\_\_\_\_

(If outside U.S., print answer above and skip to 15a.)

**(2) Name of county in the U.S.** →

\_\_\_\_\_

**(3) Name of city or town in the U.S.** →

\_\_\_\_\_

**(4) Did this person live inside the city or town limits?**

Yes

No, lived outside the city/town limits

### Instructions:

**14a.** Mark **Yes** if this person lived in this same house or apartment on April 1, 1985, even if he/she moved away and came back since then. Mark **No** if this person lived in the same building but in a different apartment (or in the same mobile home or trailer but on a different lot or trailer site).

**b.** If this person lived in a different house or apartment on April 1, 1985, give the location of this person's usual home at that time.

#### Part (1)

If the person lived in the United States on April 1, 1985, print the name of the State (or District of Columbia) where he or she lived. Continue with parts (2) through (4).

If the person lived in a U.S. territory or commonwealth, print the name of the territory or commonwealth, such as Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, or Northern Marianas. Then go to question 15a.

If the person lived outside the United States, print the name of the foreign country or area where he or she lived. Specify whether Northern Ireland or the Republic of Ireland (Eire); East or West Germany; North or South Korea; England, Scotland or Wales (not Great Britain or United Kingdom). Specify the particular country or island in the Caribbean (not, for example, West Indies). Then go to question 15a.

#### Part (2)

If the person lived in Louisiana, print the parish name. If the person lived in Alaska, print the borough name. If the person lived in New York city and the county name is not known, print the borough name. If the person lived in an independent city (not in any county) or in Washington, D.C., leave blank and enter the city name in part (3).

#### Part (3)

If the person lived in New England, print the name of the town rather than the village name, unless the name of the town is not known. If the person lived outside the limits or boundaries of any city or town, print the name of the post office or the nearest town and mark **No, lived outside the city/town limits** in part (4).

#### Part (4)

Mark **Yes** if the location is now inside the city/town limits even if it was not inside the limits on April 1, 1985; that is, if the area was annexed by the city/town since that time.

Each census, beginning with 1940, included a question on residence 5 years earlier, except for 1950, when the question asked for residence 1 year earlier. The migration

questions, asked on a sample basis since 1970, were used in conjunction with current residence to determine the extent of residential mobility of the population.

Question 14a was a screener to determine whether the person was a mover, a nonmover, or less than 5 years old. Question 14b, parts (1) through (3), collected names of State or foreign country, and county and place (city or town) (in the United States only) of previous residence. Question 14b, part (4), asked whether the previous residence was inside the city or town limits of the reported place. The 1990 questions were the same as the 1970 and 1980 questions, except for slight differences in wording.

**Coding**—Migration coding required matching the responses to the appropriate reference file and then attaching geographic codes. Two reference files were used for migration coding. The SFCF contained (1) the names and abbreviations of each State, the District of Columbia, Puerto Rico, and the outlying areas of the United States; and (2) the official names, alternate names, and abbreviations of foreign countries and selected foreign city, State, province, and regional names. The Geographic Areas File (GAF) contained the names of the geographic components within each State, including each (1) county or county equivalent; (2) city, town, village, or borough; (3) minor civil division (only in the nine Northeastern States); (4) post office names; and (5) names of census designated places.

Once the write-in responses to these questions were keyed, the responses were matched to the reference files in a two-step machine-coding operation. First, the State or foreign-country response was matched to the SFCF; then, if the previous residence was the United States, the county and place responses were matched to the GAF.

During the machine-coding stage, the responses did not have to match a reference-file entry exactly. The coding algorithm allowed for equivocations such as using soundex values of letters (for example, m=n, f=ph, etc.) and reversing consecutive letter combinations (ie-ei). Each equivocation was assigned a numeric value or confidence level, with exact matches receiving the best score or highest confidence. The responses had to match a reference-file entry with a high level of confidence in order for the machine code to be accepted. About 95 percent of the migration responses were matched with an acceptable confidence during machine coding.

The remaining 5 percent of responses were coded in a CACC operation. Clerks used an interactive computer system to select reference-file entries that they thought best matched the responses, then the computer automatically assigned the codes associated with that geographic entity. The CACC-operation work units included a three-way independent quality-control sample of the responses requiring clerical coding and a quality-control sample of the responses that were machine coded. It also included a referral coding unit that used paper reference materials to code names not included in the reference files.

**Editing and allocation**—When incomplete information on residence in 1985 was reported for a person, previous residence for other family members, if available and consistent with partial responses, was used to assign it; if not available, the previous residence of another person with similar characteristics for whom complete information had been provided was allocated. In 1980, nonresponse was assigned or allocated in a similar manner. Migration data from the 1960 and 1970 censuses are less comparable because nonresponse was not allocated.

### Question 15. Language

|  |
|--|
| <p><b>15a. Does this person speak a language other than English at home?</b></p> <p><input type="radio"/> Yes    <input type="radio"/> No — <i>Skip to 16</i></p>  |
| <p><b>b. What is this language?</b></p> <p>_____</p> <p>(For example: Chinese, Italian, Spanish, Vietnamese)</p>   |
| <p><b>c. How well does this person speak English?</b></p> <p><input type="radio"/> Very well    <input type="radio"/> Not well</p> <p><input type="radio"/> Well    <input type="radio"/> Not at all</p> |

### Instructions:

- 15.** Mark **Yes** if the person sometimes or always speaks a language other than English at home.
- Do not mark **Yes** for a language spoken only at school or if speaking is limited to a few expressions or slang.
- Print the name of the language spoken at home. If this person speaks more than one non-English language and cannot determine which is spoken more often, report the first language the person learned to speak.

A question on language has appeared in all censuses since 1890. Comparability is limited by changes in the question wording and the subpopulations to which they apply. The censuses from 1910 to 1940, 1960, and 1970 contained questions, asked often only of the foreign born, on "mother tongue" (e.g., for 1970, "What language, other than English, was spoken in this person's home when he was a child?" or, for earlier censuses, "mother tongue," "native language," or "language spoken in home before coming to U.S.>").

Only the 1980 question and population universe are comparable to 1990. The one significant change from 1980 to 1990 was from hand coding the "write-in" language to computer coding. Data from this inquiry are used to identify geographic areas with large numbers of individuals with limited English-speaking ability, as well as concentrations of speakers of a particular non-English language. These statistics are important for the implementation of the Voting Rights Act and various other Federal programs.

Data on ability to speak English represent the person's own perception about his or her own ability or that of another household member (such as the person who completed the questionnaire).

The 1990 question, similar to that asked in 1980, focused on current language usage. The data collected are used to aid in assessing needs for bilingual education and other services, such as voting materials and transportation or hospital systems, for persons who spoke languages other than English.

The wording of question 15a for 1990 was changed from the 1980 version by dropping the phrase "speaks only English" from the "No" response category.

**Coding**—The write-in responses listed in 15b (specific language spoken) were transcribed onto computer files and coded into more than 380 detailed language categories, using an automated coding system that compared the reported responses with entries in a computer dictionary, which initially contained around 2,000 language names. The dictionary was updated with a large number of new names, variations in spelling, and a small number of residual categories. Each write-in response was given a numeric code associated with one of the detailed categories in the dictionary. If the respondent listed more than one non-English language, only the first was coded.

See appendix 14C for an illustration of the content of the classification schemes used to present language data.

**Editing and allocation**—For individuals who indicated in 15a that they spoke a language other than English at home but did not specify the name of the language in 15b, the language was assigned based on either (1) the language of other speakers in the household, (2) the language of a person of the same Hispanic origin or detailed race group living in the same or a nearby area, or (3) a person of the same ancestry or place of birth. In all cases where a person was assigned a non-English language, that language was assumed to be spoken at home. People for whom 15a was blank and a language other than English was entered in 15b were assumed to speak that language at home.

Individuals reported to speak a language other than English at home but whose ability to speak English was not reported were assigned the English-language ability of a randomly selected person of the same age, Hispanic origin (if appropriate), nativity, year of entry, and language group.

In households where one or more people at least 5 years old spoke a language other than English, the household language assigned to all household members was the non-English language spoken by the first person with a non-English language in the following order: householder, spouse, parent, sibling, child, grandchild, other relative, stepchild, unmarried partner, housemate or roommate, roomer, boarder or foster child, or other nonrelative.

### Question 16. Age Screen

|  |
|--|
| <p><b>16. When was this person born?</b></p> <p><input type="radio"/> Born before April 1, 1975 — <i>Go to 17a</i></p> <p><input type="radio"/> Born April 1, 1975 or later — <i>Go to questions for the next person</i></p> |
|--|

Instructions: None.

This item was used to screen for individuals 15 years of age and older, for whom the balance of the inquiries on the questionnaire would be asked, and to alert district-office staff and/or the computer program that data would be expected; conversely, any subsequent entries for persons under 15 would be deleted. The cutoff age was 14 in the 1970 census to permit labor-force tabulations comparable to earlier decades. Later, the official definition of the labor force had been changed to include only individuals age 16 years and over. However, age 15 was selected for 1980 and retained in 1990, so that data on fertility could be prepared for the 5-year age group ending in 19.

**Coding**—No coding was necessary for item 16.

**Editing and allocation**—The computer used these entries only as indications that subsequent responses for a particular person either were to be ignored or edited and/or supplied. It involved no tabulation. Processing staff compared the entry in 16 with the age found in question 5 and completed or corrected 16 as necessary. If the person was born before April 1975, the reviewers were to continue with the next question. If the person was born on or after April 1975, they were to skip the remaining questions for the person and go to question 8 for the next person entered, if any.

### Question 17. Veteran Status, Period of Active Duty Military and Years of Active Duty Military Service

**17a. Has this person ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? If service was in Reserves or National Guard only, see instruction guide.**

Yes, now on active duty  
 Yes, on active duty in past, but not now  
 Yes, service in Reserves or National Guard only — *Skip to 18*  
 No — *Skip to 18*

**b. Was active-duty military service during —**  
Fill a circle for each period in which this person served.

September 1980 or later  
 May 1975 to August 1980  
 Vietnam era (August 1964—April 1975)  
 February 1955—July 1964  
 Korean conflict (June 1950—January 1955)  
 World War II (September 1940—July 1947)  
 World War I (April 1917—November 1918)  
 Any other time

**c. In total, how many years of active-duty military service has this person had?**

Years

Instructions:

**17a.** For a person with service in the National Guard or a military reserve unit, fill one of the two **Yes, active duty** circles if and only if the person has ever been called up for active duty other than training; otherwise, mark **Yes, service in Reserves or National Guard only**. For a person whose only service was as a civilian employee or volunteer for the Red Cross, USO, Public Health Service, or War or Defense Department, mark **No**. Count **World War II Merchant Marine Seaman service** as active duty; do **not** count other Merchant Marine service as active duty.

A question on military pensioners was asked in the 1840 census and on Civil War veterans in 1890 and 1910. The 1890 census also included a special questionnaire on U.S. military Civil War veterans (excluding Confederate veterans) and their widows. An item on veteran status has been included in each enumeration since 1930. Initial data on veteran status of women was collected in 1980.

This question appeared in two parts in 1980, three parts in 1990. The 1980 equivalent to 1990 question 17a asked for a "Yes" or "No" response to the question, "Is this person a veteran of active duty military service in the Armed Forces of the United States?" It carried an identical referral to the instruction guide for duty in the National Guard or reserves *only*, where the answer was to be "no" unless called to active duty in U.S. forces.

The 1990 question 17b pertained to all respondents with either current or past active-duty military service, even for brief periods. The two 1990 response categories for the most recent periods, "May 1975 to August 1980" and "September 1980 or later," replaced the single 1980 item, "May 1975 or later." Although this represented a departure from the pattern of previous censuses, which did not split peacetime periods but separated them only by wartime periods, changes in veterans-benefit laws<sup>9</sup> prompted division of the category of the post-Vietnam peacetime era. One new provision of these laws denied most benefits to persons who failed to complete at least 2 years of an original enlistment beginning on or after September 8, 1980; the split of the peacetime service category thus conformed with this date.

Question 17c, new for the 1990 census, used an open-ended format to ask persons with active-duty military service to show the number of years they served. This question evolved in response to strong recommendations by Federal agencies, especially the Departments of Veterans Affairs (VA) and Defense (DOD), as a result of the new laws mentioned above. This new question on years of military service, along with the "September 1980 or later" period of service category, would enable the census to produce statistics approximating the universe of VA benefit programs reflecting the new ruling. The DOD wanted these data for studies such as measuring the effects of length of military service on post-service earnings.

<sup>9</sup>Title 10, section 977, of the U.S. Code. In 1981, this title was superseded by Title 38, U.S. Code, which applied to all persons covered under Title 10 as well as to certain reservists and commissioned officers who entered active duty after October 10, 1981.

The following people might have tended to report erroneously that they served on active duty in the Armed Forces: (a) individuals who served only in the National Guard or military reserves; (b) civilian employees or volunteers of the United Service Organizations, Red Cross, or the DOD (or its predecessors, the Department of War and Navy); and (c) employees of the Merchant Marine or Public Health Service. There also may have been a tendency for people erroneously to round months up to the nearest year in 17c. (For example, persons with 1 year and 8 months of active-duty military service may have reported, mistakenly, "2 years.")

The wording of 17a for 1990 was expanded from the counterpart veteran/not veteran item in 1980 to include current active-duty status and service in the military reserves and the National Guard only. The expansion was intended to clarify the appropriate response for people in the Armed Forces and for individuals who served in the National Guard or military reserve units only. For the first time in a census, service during World War II as a merchant-marine seaman was considered active-duty military service, and persons with such service were counted as veterans. As in 1970 and 1980, respondents reporting more than one period of service were shown in the most recent wartime period-of-service category in tabulations.

**Coding**—No coding was necessary for item 17.

**Editing and allocation**—Responses to item 17b were edited to eliminate inconsistencies between reported period(s) of service and the age of the person and to disallow reported combinations of periods containing unreasonable gaps (for example, a person could not serve during World War I and the Korean conflict without serving during World War II). Responses in item 17c were edited for consistency with responses to item 17b and with the age of the person. Allocations were made by imputation to the nonreporting person from a reported person with similar characteristics.

## Question 18. Work Disability

|   |                          |
|---|--------------------------|
| <p>18. Does this person have a physical, mental, or other health condition that has lasted for 6 or more months and which —</p> |                          |
| <p>a. Limits the kind or amount of work this person can do at a job?</p>  |                          |
| <input type="radio"/> Yes   | <input type="radio"/> No |
| <p>b. Prevents this person from working at a job?</p>   |                          |
| <input checked="" type="radio"/> Yes  | <input type="radio"/> No |

### Instructions:

18. Mark **Yes** to part (a) if a health condition substantially limits this person in his or her choice of occupation or if the condition limits the amount of work that can be accomplished in a given period of time. Mark **Yes** to part (b) if the health condition prevents this person from holding any significant employment.

While the 1880 through 1910 censuses (sometimes in supplementary questionnaires) included inquiries on mental, physical, and/or other disabilities, no item on disability appeared in later censuses until 1970 (in the 5-percent sample). The question then asked only whether the individuals had a condition affecting their ability to work and how long this limitation had existed.

This question was the first of two 1990 inquiries on disability. Work disability had important implications for many Federal, State, and local government programs, including income maintenance (Social Security disability benefits), rehabilitation, and public assistance. Persons identified as having a work disability had a health condition that lasted for 6 or more months and limited the kind or amount of work they could do at a job or prevented their working at a job. The term "health condition" referred to both physical and mental conditions but excluded temporary health problems, such as a broken bone expected to heal normally.

The disability question in the 1980 census had three parts: work limitation, work prevention, and limitation or prevention in the capacity to use public transportation. People were considered to have had a transportation disability if they had a health condition, lasting for 6 or more months, that made it difficult or impossible to use buses, trains, subways, or other forms of public transportation.

Postcensal studies showed that the 1980 item on public-transportation disability provided data of limited usefulness. Available public-transportation services varied widely from one community to another, a factor that made data on public-transportation disability difficult to interpret. Moreover, planners noted that the data were too general to be of real value for their purposes. For these reasons, the Health and Disability Interagency Working Group (see ch. 2) recommended dropping the transportation segment of the work-disability question for the 1990 census. Members of the Transportation Interagency Working Group concurred.

**Coding**—No coding was required for item 18.

**Editing and allocation**—Responses to questions 18 and 19 were edited together. For item 18, the computer first eliminated consideration of entries for persons under 16 years of age, in military installations, or in certain group quarters. Four matrices for item 18 contained fully reported data based on age, race, employment status, and school years completed/age. These matrices were used to allocate (1) whether a disability limited the kind or amount of work a person in the labor force could do and (2) whether the disability prevented a person not in the labor force from working or limited the kind or amount of work such individuals could do.



## Instructions:

### 21a. Count as work — Mark Yes:

- Work for someone else for wages, salary, piece rate, commission, tips, or payments "in kind" (for example, food, lodging received as payment for work performed).
- Work in own business, professional practice, or farm.
- Any work in a family business or farm, paid or not.
- Any part-time work including babysitting, paper routes, etc.
- Active duty in Armed Forces.

### Do not count as work — Mark No:

- Housework or yard work at home.
- Unpaid volunteer work.
- School work.
- Work done as a resident of an institution.

### 25. Was this person TEMPORARILY absent or on layoff from a job or business LAST WEEK?

- Yes, on layoff
- Yes, on vacation, temporary illness, labor dispute, etc.
- No

## Instructions:

25. If the person works only during certain seasons or on a day-by-day basis when work is available, mark **No**.

### 26a. Has this person been looking for work during the last 4 weeks?

- Yes
- No — Skip to 27

### b. Could this person have taken a job LAST WEEK if one had been offered?

- No, already has a job
- No, temporarily ill
- No, other reasons (in school, etc.)
- Yes, could have taken a job

## Instructions:

- 26a. Mark **Yes** if the person tried to get a job or to start a business or professional practice at any time in the last 4 weeks; for example, registered at an employment office, went to a job interview, placed or answered ads, or did anything toward starting a business or professional practice.
- b. Mark **No, already has a job** if the person was on layoff or was expecting to report to a job within 30 days.  
Mark **No, temporarily ill** if the person expects to be able to work within 30 days.  
Mark **No, other reasons** if the person could not have taken a job because he or she was going to school, taking care of children, etc.

These three questions—work during the previous week (21), temporary absence from work (25), and job search and availability (26)—were used together and in combination with 28a (industry from which Armed Forces status was derived) and other economic items to discover the person's labor force status in the "reference week." The reference week referred to the calendar week preceding

the date on which respondents completed their questionnaires or were interviewed by enumerators. It was not the same for respondents since the enumeration was not completed in 1 week. The labor force status categories, defined in subsequent sections, may be diagrammed as follows:

### Labor force

Armed Forces, at work

Armed Forces, with a job but not at work

Civilian labor force

Employed → at work → actual hours worked

↙  
with a job but not at work

Unemployed

### Not in the labor force

"Discouraged workers," students, housewives, inmates of institutions, etc.

In addition, the category "experienced civilian labor force," comprising the employed and the experienced unemployed, was used in certain industry and occupation tabulations that included unemployed persons.

The regular 1930 census questionnaire contained an item on job activity yesterday; a supplemental schedule on unemployment asked questions on temporary absence from work, looking for work, and availability to accept a job. An inquiry on actual hours worked last week was added in the 1960 census, and the item on usual hours worked last week was adopted in 1980. In 1940, 1950, and 1960, the statistics were presented for persons 14 years of age and over; and in 1970 and 1980, for persons 16 years old and over. In 1970 tabulations for 14- and 15-year-olds allowed comparability with earlier censuses; in 1980, the data were collected for 15-year-olds but tabulated in general for persons 16 years old and over.

Wording of the 1990 question on "work last week" (21a) was identical to that for 1980; wording for 21b was also identical to that for 1980, in which respondents wrote in the number of hours they worked in the full calendar week (the reference week, which could differ from person to person) preceding the date the questionnaire was completed. (That date was not necessarily Census Day.) Item 21a (work status) was the key component in determining employment status. As such, it separated the population age 16 years and over into those "at work" or "not at work" during the previous week. Individuals "not at work" were asked an additional set of questions to determine their specific "not at work" category; that is, "with a job, not at work," "unemployed," or "not in the labor force." The 1990 version retained the 1980 wording because, among other considerations, it was felt to be historically comparable and conceptually clear. Item 21b referred to the actual, not the



usual or regular, number of hours worked during the reference (i.e., previous) week. Among other uses, data from this question (21b) were used in the determination of employment status for unpaid family workers.

For question 25 (temporary absence from work), the 1980 version remained unchanged throughout all testing and the dress-rehearsal phases and was adopted for the 1990 census. It separated respondents not at work into three groups: unemployed on layoff, employed with a job but not at work, and others not working.

Question 26a (looking for work during the last 4 weeks) was used as a means of separating the last mentioned group ("other persons not working") identified in question 25 into two groups: Unemployed respondents looking for work and people not in the labor force. The 1990 question was identical in wording to that used in 1980. Item 26b (availability to accept a job) was asked of people who were seeking work. The 1990 question, while similar to that asked in 1980, included the explicator, "if one had been offered," in the opening statement.

"Labor force" referred to everyone in the Armed Forces or in the civilian labor force. The "Armed Forces" comprised people 16 years old and over on active duty in the U.S. Army, Air Force, Navy, Marine Corps, or Coast Guard, but not members of the merchant marine or civilian employees of the DOD. The "Armed Forces" designation was made using information from question 28 or information about the type of group quarters the person resided in.

The "civilian labor force" was made up of employed and unemployed civilians. "Employed" referred to people 16 years old and over who were either (a) "at work": those who did any work at all as paid employees, in their own business or profession, on their own farm, or for 15 or more hours as unpaid workers in a family business or farm; or (b) "with a job but not at work": those who did not work during the reference week but had jobs or businesses from which they were temporarily absent due to illness, bad weather, industrial dispute, vacation, or other personal reasons. "Employed" excluded respondents whose only activity consisted of work around the house or volunteer work for religious, charitable, and similar organizations. "At work" employed individuals were sometimes further classified as "full time" or "part time," based on whether they worked 35 hours or more during the reference week. "Unemployed" civilians were those, age 16 and over, who were neither "at work" nor "with a job, but not at work" and who were (a) looking for work during the previous 4 weeks and (b) available to accept work. Examples of job-seeking included (1) registering at a public or private employment office, (2) meeting with prospective employers, (3) investigating possibilities for starting a professional practice or investigating or opening a business, (4) placing or answering advertisements, (5) writing letters of application, and (6) being on a union or professional register. Also included as "unemployed" were individuals who did not work at all during the reference week and were waiting to be called back to a job from which they had been laid off.

"Not in the labor force" encompassed people 16 years of age and over who were not classified as members of the labor force under the definitions outlined above. This category consisted mainly of students, housewives, retired workers, seasonal workers enumerated in an "off" season who were not looking for work, institutionalized people, and individuals doing only incidental unpaid family work (i.e., fewer than 15 hours during the reference week). Also included were the so-called "discouraged workers" who did not have a job and had not actively looked for work during the previous 4 weeks. (Institutionalized persons sometimes were shown as a subcategory within "Not in the labor force"; tasks they performed were not considered "work" within the census definition.)

**Keying**—Among the three employment questions, only the write-in response to 21b needed keying. Fractions were rounded to whole numbers and the midpoint of ranges were calculated. Entries of "Full time" were keyed as 40 hours. Entries exceeding 140 hours were set to "99." Those indicating "more than," "over," "less than," "under" "approximately," "about," "around," and the like were ignored and the number of hours were keyed as given.

**Editing and allocation**—Data for unreported or incomplete employment-status responses (21, 25, and 26) were allocated by assigning the employment status of a person with similar characteristics (e.g., age, sex, household relationship, school enrollment, educational attainment, presence and age of children).

## Question 22. Place of Work

|  |   |
|--|---|
| <b>22. At what location did this person work LAST WEEK?</b><br>If this person worked at more than one location, print where he or she worked most last week.   |   |
| a. Address (Number and street) ↘<br><div style="border: 1px dashed black; height: 20px; width: 100%;"></div><br>(If the exact address is not known, give a description of the location such as the building name or the nearest street or intersection.) |   |
| b. Name of city, town, or post office ↘<br><div style="border: 1px dashed black; height: 20px; width: 100%;"></div>  |   |
| c. Is the work location inside the limits of that city or town?<br><input type="radio"/> Yes <input type="radio"/> No, outside the city/town limits  |   |
| d. County ↘<br><div style="border: 1px dashed black; height: 20px; width: 100%;"></div>  |   |
| e. State ↘<br><div style="border: 1px dashed black; height: 20px; width: 100%;"></div>   | f. ZIP Code ↘<br><div style="border: 1px dashed black; height: 20px; width: 100%;"></div> |



## Instructions:

- 22a.** Include the street type (for example, St., Road, Ave.) and the street direction (if a direction such as "North" is part of the address). For example, print 1239 N. Main St. or 1239 Main St., N.W. not just 1239 Main.

*If the only known address is a post office box, give a description of the work location. For example, print the name of the building or shopping center where the person works, the nearest intersection, the nearest street where the workplace is located, etc. DO NOT GIVE A POST OFFICE BOX NUMBER.*

*If the person worked at a military installation or military base that has no street address, report the name of the military installation or base.*

*If the person worked at several locations, but reported to the same location each day to begin work, print the address of the location where he or she reported. If the person did not report to the same location each day to begin work, print the address of the location where he or she worked most last week.*

*If the person's employer operates in more than one location (such as a grocery store chain or public school system), print the exact address of the location or branch where the person worked. If the exact address of a school is not known, print the name of the school.*

*If the person worked on a college or university campus and the exact address of the workplace is not known, print the name of the building where he or she worked.*

- d.** *If the person worked in New York city and the county is not known, print the name of the borough where the person worked.*

*If the person worked in Louisiana, print the name of the parish where the person worked.*

*If the person worked in Alaska, print the name of the borough where the person worked.*

- e.** *If the person worked in a foreign country or Puerto Rico, Guam, etc., print the name of the country in 22e and leave the other parts of question 22 blank.*

The place-of-work question first was asked in 1960, when only city, county, and State were requested.

This question applied to respondents 16 years old and over who indicated in question 21 (work status last week) that they worked at any time during the previous week. It referred to the actual geographic location of the plant, office, store, or other workplace where the person worked most of the time during the week.

The 1980 instruction guide directed the respondent to write "various locations" in the address line (22a) if one workplace could not be decided upon, and to give as much information as possible in the remainder of the question to identify the area in which the person worked the greatest number of hours during the previous week. "Various locations" did not produce consistent information, so the 1990 census omitted the 1980 instruction—"If one location cannot be specified, see instruction guide." The 1990 question requested that the respondent report the location at which he/she worked the greatest number of hours. Also, the 1990 question omitted "shopping center" (one of the examples in the 1980 instruction) because responses of

shopping center names as places of work sometimes were not specific enough to be able to code place of work down to the level of geography required.

In item 22b for 1990, "post office" replaced the less frequently reported entries of "village" and "borough" as examples of responses in 1980. The addition of "post office" also reflected the fact that many respondent perceived their workplace address as being the same as the name of the local post office.

To clarify item 22c for 1990, the distinction between inside/outside incorporated limits, asked in 1980, was dropped in favor of less technical language that emphasized the difference between working within a city and working at a location that used the city as its mailing address but was actually outside the city's legal boundaries.

**Coding**—In areas where the workplace address was coded to the block level, respondents were tabulated as working inside or outside a specific place based on the location of that address, regardless of the response to question 22c concerning city/town limits. In areas where it was impossible to code the workplace address to the block level, respondents were tabulated as working in a place if a place name was reported in question 22b and the response to 22c was either "Yes" or the item was left blank. If a census designated place (CDP) name appeared in 22b, the place-of-work data could have been affected by the extent to which the name was familiar to respondents, and by coding problems caused by similarities between the CDP name and the names of other geographic jurisdictions in the same vicinity.

When a respondent reported a locality or incorporated place that formed a part of a township or town in the nine Northeastern States, the coding and tabulating procedure was designed to include the response in the total for the township or town. The accuracy of the place-of-work data for minor civil divisions was greater for the New England States. However, the data for some towns in New England and New York and townships in New Jersey and Pennsylvania may have been affected by coding problems that resulted from the unfamiliarity of the respondent with the minor civil division in which the workplace was located or when a township and a city or borough of the same or similar name were located close together.

**Editing and allocation**—When place of work was not reported or the response was incomplete, a work location was allocated to the person based on his or her means of transportation to work (23a), travel time to work (24b), industry (28b), location of residence (14), and the workplace of others.

## 23. Means of Transportation to Work

**23a. How did this person usually get to work LAST WEEK?** If this person usually used more than one method of transportation during the trip, fill the circle of the one used for most of the distance.

Car, truck, or van       Motorcycle  
 Bus or trolley bus       Bicycle  
 Streetcar or trolley car       Walked  
 Subway or elevated       Worked at home  
 Railroad       *Skip to 28*  
 Ferryboat       Other method  
 Taxicab

*If "car, truck, or van" is marked in 23a, go to 23b. Otherwise, skip to 24a.*

**b. How many people, including this person, usually rode to work in the car, truck, or van LAST WEEK?**

Drove alone       5 people  
 2 people       6 people  
 3 people       7 to 9 people  
 4 people       10 or more people

### Instructions:

- 23a.** If the person usually used more than one type of transportation to get to work (for example, rode the bus and transferred to the subway), fill the circle of the one method of transportation that he/she used for most of the distance during the trip.
- b.** If the person was driven to work by someone who then drove back home or to a nonwork destination, fill the circle for **Drove alone**.  
DO NOT include persons who rode to school or some other nonwork destination in the count of persons who rode in the vehicle.

While data on the means of transportation to work have been collected in the censuses since 1960, published statistics for each census have not been entirely comparable. Four categories of mode of transportation to work—truck, van, motorcycle, and bicycle—were added in 1980.

As with the place-of-work question, the universe for means of transportation to work was limited to respondents 16 years old and over who indicated in item 21a that they worked at any time during the previous week. Means of transportation to work referred to the principal mode of travel or type of conveyance the person usually used to get from home to work during that week. The 1980 census question asked for the principal means (the one usually used for most of the distance) of transportation to work.

In question 23a for 1990, a single response category for "Car, truck, or van" combined the individual 1980 categories for "Car," "Truck," and "Van"; the dual response categories "Bus or trolley bus" and "Streetcar or trolley car" represented a split of the 1980 category for "Bus or streetcar"; a new response category "Ferryboat" appeared in the census for the first time; "Walked" replaced "Walked only"; and "Other method," minus a write-in box, replaced "Other," with a write-in box for specification, because only a very small proportion (less than 1 percent) of workers had marked this category in 1980.

The 1990 question 23b included information on private vehicle occupancy for persons who worked at some time during the previous week and reported "Car, truck, or van" as their means of transportation to work. It excluded persons who used another means of transportation or who rode to school or some other nonwork destination. The number of categories increased to eight in 1990 from six in 1980, as the upper-level categories, "7 to 9 people" and "10 or more people," replaced the single upper-level category of "7 or more people." The category, "Drove alone," presented in 1980 as part of a driving arrangements question, was included in this question in 1990.

**Coding**—None was required for item 23.

**Editing and allocation**—Unreported or incomplete responses for this item were allocated based on the employment status (21), sex (3), race (4), and residence (14) of the person and the means of transportation of other persons.

## Question 24. Time of Departure From Home and Travel Time to Work

**24a. What time did this person usually leave home to go to work LAST WEEK?**

a.m.  
 p.m.

**b. How many minutes did it usually take this person to get from home to work LAST WEEK?**

Minutes — *Skip to 28*

### Instructions:

- 24a.** Give the time of day the person usually left home to go to work. DO NOT give the time that the person usually began his or her work.  
If the person usually left home to go to work sometime between 12:00 o'clock midnight and 12:00 o'clock noon, fill the a.m. circle.  
If the person usually left home to go to work sometime between 12:00 o'clock noon and 12:00 o'clock midnight, fill the p.m. circle.
- b.** Travel time is from door to door. Include time taken waiting for public transportation or picking up passengers in a carpool.

The 1980 census was the first to include a question on travel time, which referred to the total number of minutes usually spent in traveling from home to work (one way) the previous week. In 1990, departure time was added. Travel time was calculated from door to door and included time spent waiting for public transportation, picking up passengers in carpools, etc. Because many commuters could not report accurately the exact distance of their trip from home to work (for example, public-transit passengers or carpool riders who never drove to work), travel time was a better indicator of approximate distance to work and relative efficiency of various transportation modes.

**Coding**—No coding was necessary for item 24.

**Editing and allocation**—Data for unreported or incomplete responses were allocated based on the employment status (21), sex (3), and means of transportation of the person and the departure and travel time of other respondents.

### Question 27. Year Last Worked

|  |            |                                       |
|--|------------|---------------------------------------|
| 27. When did this person last work, even for a few days? |            |                                       |
| <input type="radio"/> 1990                               | } Go to 28 | <input type="radio"/> 1980 to 1984    |
| <input type="radio"/> 1989                               |            | <input type="radio"/> 1979 or earlier |
| <input type="radio"/> 1988                               |            | <input type="radio"/> Never worked    |
| <input type="radio"/> 1985 to 1987                       |            |                                       |
|  |            |                                       |
|  |            | } Skip to 32                          |

### Instructions:

**27.** Look at the instructions for question 21a to see what to count as work. Mark **Never worked** if the person: (1) never worked at any kind of job or business, either full or part time, (2) never did any work, with or without pay, in a family business or farm, and (3) never served in the Armed Forces.

This question was asked of all individuals who did not work during the reference week (i.e., had a "No" response in question 21a on work status last week). The question acted primarily as a screening device for the industry, occupation, class-of-worker, and work-experience items (see items 28-30 below) so that respondents who had never worked or had last worked more than 5 years ago were not asked to answer them. Screening out these questions reduced respondent burden as well as processing costs. Furthermore, information obtained from this item helped to classify respondents in an employment-status category when entries to some of the other items were missing or inconsistent. The 1990 question was identical to that used in 1980, except for the addition of an arrow "Go to" instruction bracketing the four response categories for people who had worked within the past 5 years. The data furnished counts of individuals by year last worked. The data could be used for studies of work experience and evaluations of the applicability and significance of occupational skills for respondents not currently in the labor force.

**Coding**—No coding was required for item 27.

**Editing and allocation**—This inquiry was edited for consistency with the employment-status classification and with the response to question 31. Nonresponses were allocated a value from a person with similar characteristics in conjunction with allocations for missing entries to items 28-32.

### Questions 28-30. Industry, Occupation, and Class of Worker

**28-30. CURRENT OR MOST RECENT JOB ACTIVITY.** Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for his/her last job or business since 1985.

Inquiries on industry were included in the decennial censuses of 1820 and 1840 and in each census since 1910. Occupation was asked for all free inhabitants in 1850 and 1860, and all subsequent censuses have included questions on occupation. The 1910 census was the first to include a question on class of worker. The questions on industry, occupation, and class of worker have been asked on a sample basis since 1960.

In the 1990 census, as in 1980, this series of questions was asked on a sample basis of all respondents 16 years old and over who worked in the past 5 years. It was used to obtain industry, occupation, and class-of-worker information for employed people, unemployed people who worked some time during the previous 5 years (part of the experienced unemployed), and people who had worked some time during the past years but were not currently in the labor force (labor reserve). Data for the last group were obtained as a byproduct of asking this information of the unemployed.

Each of these three items was to relate to the same job—i.e., the person's chief job activity or business. For employed respondents, the information referred to the job held during the reference week (i.e., the full calendar week immediately preceding the day the respondent or the enumerator completed the questionnaire—not necessarily April 1). Individuals employed at two or more jobs were to report the job at which they worked the greatest number of hours during the reference week. For experienced unemployed respondents and for experienced respondents not in the labor force, the data referred to the last job they had held within the previous 5 years.

The instructions just described were placed on the 1990 questionnaire in a separate box preceding the job-description series (see box above). Other than updating the reference period, the 1990 instruction box was identical to that used in 1980.

**28. Industry or Employer**

a. For whom did this person work? If now on active duty in the Armed Forces, fill this circle  and print the branch of the Armed Forces.

(Name of company, business, or other employer)

b. What kind of business or industry was this? Describe the activity at location where employed.

(For example: hospital, newspaper publishing, mail order house, auto engine manufacturing, retail bakery)

c. Is this mainly — Fill ONE circle

|                                       |  |
|---------------------------------------|--|
| <input type="radio"/> Manufacturing   | <input type="radio"/> Other (agriculture, construction, service, government, etc.) |
| <input type="radio"/> Wholesale trade |  |
| <input type="radio"/> Retail trade    |  |

**Instruction:**

- 28a.** If the person worked for a company, business, or government agency, print the name of the company, not the name of the person's supervisor. If the person worked for an individual or a business that had no company name, print the name of the individual worked for. If the person worked in his/her own business, print "self-employed."
- b.** Print two or more words to tell what the business, industry, or individual employer named in 28a did. If there is more than one activity, describe only the major activity at the place where the person worked. Enter what is made, what is sold, or what service is given. Some examples of what to enter:
- |  |                   |
|--|-------------------|
| Enter a description like the following — | Do not enter —    |
| Metal furniture manufacturing            | Furniture company |
| Retail grocery store                     | Grocery store     |
| Petroleum refining                       | Oil company       |
| Cattle ranch                             | Ranch             |

**29. Occupation**

a. What kind of work was this person doing?

(For example: registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, cake icer)

b. What were this person's most important activities or duties?

(For example: patient care, directing hiring policies, supervising order clerks, assembling engines, icing cakes)

**Instructions:**

- 29.** Print two or more words to describe the kind of work the person did. If the person was a trainee, apprentice, or helper, include that in the description. Some examples of what to enter:
- |  |                |
|--|----------------|
| Enter a description like the following — | Do not enter — |
| Production clerk                         | Clerk          |
| Carpenter's helper                       | Helper         |
| Auto engine mechanic                     | Mechanic       |
| Registered nurse                         | Nurse          |

**30. Was this person — Fill ONE circle**

Employee of a PRIVATE FOR PROFIT company or business or of an individual, for wages, salary, or commissions

Employee of a PRIVATE NOT-FOR-PROFIT, tax-exempt, or charitable organization

Local GOVERNMENT employee (city, county, etc.)

State GOVERNMENT employee

Federal GOVERNMENT employee

SELF-EMPLOYED in own NOT INCORPORATED business, professional practice, or farm

SELF-EMPLOYED in own INCORPORATED business, professional practice, or farm

Working WITHOUT PAY in family business or farm

**Instructions:**

- 30.** Mark Employee of a PRIVATE NOT-FOR-PROFIT . . . organization if the person worked for a cooperative, credit union, mutual insurance company, or similar organization.
- Employees of foreign governments, the United Nations, and other international organizations should mark PRIVATE NOT-FOR-PROFIT . . . organization.
- For persons who worked at a public school, college or university, mark the appropriate government category; for example, mark State GOVERNMENT employee for a state university, or mark Local GOVERNMENT employee for a county-run community college or a city-run public school.

Component 28a (industry/employer) was used to help classify the responses to the next question on kind of business or industry. In the company-name question, for people working for an individual or business with no company name, the employer's name was to be entered. "Self-employed" was to be written in for respondents working in their own businesses. The development of this question entailed changes in the format for the identification of Armed Forces personnel. Question 28 was the primary means (along with group quarters type) in the census of identifying whether an individual was currently on active duty in the Armed Forces, an identification essential for determining a person's labor force status. The introduction of the "now on active duty" category in the 1990 veteran-status question (see item 17a) did not negate the role of this question in identifying the Armed Forces because of the difference in identifying the members of the Armed Forces Reserve or National Guard who were in training. For purposes of the veteran-status item, these people were considered active-duty Armed Forces personnel; but for the employment-status items, they were included in the Armed Forces count.

In response to a request from the DOD, the Census Bureau obtained job-description information for active-duty Armed Forces members. The 1990 version asked Armed Forces personnel to fill in a circle and print their military branch. As a result, the new circle/write-in instruction for 1990 permitted Armed Forces personnel to answer the

occupation questions—a departure from the 1980 question, which asked such individuals to indicate their active-duty service by printing “AF” on the company-name line and to skip the remaining items on industry, occupation, and class of worker.

Continuing a historical practice, component 28b (kind of business/industry) was the primary industry item. The combination of the write-in response from this item and the company name was converted into a three-digit code for classification purposes (see “Coding” below). Respondents were instructed to print the type of activity engaged in by the business, industry, or individual employer that they reported in the company-name question; that is, what was made, what was sold, or what service was given. If more than one activity took place, they were to describe the major activity at the place where they worked. The 1990 question was identical to the 1980 version, except the example “retail bakery” replaced “breakfast cereal manufacturing” because three of the five examples in 1980 referred to manufacturing.

Component 28c (industry sector) served as a tool for obtaining accurate industry codes for the three major industry groups of manufacturing, wholesale trade, and retail trade. This was needed because these three major industry groups make or sell the same products. For example, if the entry in question 28b was only “furniture,” a correct response was needed in question 28c to determine if the company was a furniture factory (manufacturing) or a retail furniture store. This question was identical to that asked in 1980.

Component 29a (type of occupation) was the fundamental census item on occupation; respondents were to describe the kind of work they did. For the 1990 census, coverage of this question was broadened to allow active-duty Armed Forces personnel to report descriptions of their military jobs. The 1990 version was identical to that used in 1980, except “cake icer” replaced “grinder operator” as an example to maintain compatibility with the last industry description “retail bakery.”

Component 29b (most important activity) was used in combination with the type-of-occupation item to obtain sufficient information to classify an occupation description. The use of this additional probe permitted finer distinctions among occupational categories and allowed more detailed classifications. Armed Forces personnel also were to complete this item for the first time in the 1990 census. The 1990 version was identical to the 1980 question, except that “icing cakes” replaced “operating grinding mill” as an example to maintain consistency with parallel changes made to the examples for this job description in previous industry and occupation items.

Question 30 (class of worker) rounded out the series on job-description items. Unlike the industry and occupation questions, though, this one did not require coding but was reviewed by the coders, along with the person’s industry and occupation entries, to ensure consistent responses.

The 1990 version split the single 1980 category for “Employee of private company. . .” into two categories “Employee of a PRIVATE-FOR-PROFIT company . . .” and “Employee of a PRIVATE-NOT-FOR-PROFIT organization. . .” The separate category for employees of nonprofit organizations was introduced in response to governmental and nongovernmental data users and reflected the marked growth in nonprofit organizations and their increasing share of the labor market. This category applied to employees of churches, unions, political parties, nonprofit hospitals, condominium and cooperative housing projects, credit unions, and similar organizations. A distinct category for employees of nonprofit organizations also was consistent with the guidelines set forth in the *Standard Industrial Classification Manual*.<sup>5</sup> Also, the 1990 question presented the governmental levels (local, State, Federal) in reverse order of the 1980 listings (Federal, State, local).

Historically, the census class-of-worker question yielded higher figures for Federal Government workers when compared with other sources, such as records from the Office of Personnel Management (OPM). Part of this difference has been attributed to the fact that the census question, unlike data from OPM, counted “nonappropriated funds” employees as Federal workers. (These employees worked in post exchanges, base exchanges, and commissaries on military installations and were paid from revenues generated by the employing establishment.) A second reason was that the Census Bureau counted the approximately 200,000 temporary census workers hired to conduct all phases of its own census enumeration and processing as Federal employees whereas OPM did not. Employees of Federal government corporations, such as the Tennessee Valley Authority, represent a third component of the census class-of-worker category excluded in data from other sources. Another aspect of the census overcount stemmed from employees of quasi-governmental entities<sup>6</sup> classifying themselves as Federal Government employees because that was the closest category for them.

The standard text for 1990 Population Census Reports stated that employees of foreign governments, the United Nations, or other international organizations were classified as “private not-for-profit.” This did not happen. These people have a “Federal government” class of worker.

<sup>5</sup>U.S. Office of Management and Budget, *Standard Industrial Classification Manual* (Washington, DC: Government Printing Office, 1987). This report detailed the classification system developed under OMB sponsorship; the system classified establishments by the type of industrial activity in which they were engaged.

<sup>6</sup>Quasi-governmental entities included establishments controlled by the government and private sectors through joint ownership of stock or joint membership on boards of directors or other controlling bodies, for example, AMTRAK (National Railroad Passenger Corporation) and the Federal Reserve Bank.



**Coding**—Respondents provided data by writing on the questionnaires descriptions of their industry and occupation. These responses were keyed into the computer with the other long-form written responses at the seven census regional field centers. These keyed files were sent to Census Bureau headquarters where the descriptions were passed through automated coding software, which assigned industry and occupation codes to a portion of the entries. This was the first time any industry or occupation was coded by computer. The automated system assigned codes to 59 percent of the industry entries and 38 percent of the occupation entries.

Those cases not coded by the computer were referred to clerks in the Census Bureau's Kansas City processing office for coding. The clerical staff converted the written questionnaire descriptions to codes by comparing these descriptions to entries in the *Alphabetical Index of Industries and Occupations*. For the industry code, these coders also referred to an Employer Name List (formerly called "Company Name List"). This list, prepared from the Bureau's Standard Statistical Establishment List (SSEL) for the economic censuses and surveys, contained the names of business establishments and their SIC codes converted to population census equivalents. This list facilitated coding and maintained industrial classification comparability.

The responses not coded by the computer were made into work units of 150 cases each and sent for computer-assisted clerical coding. These work units were presented to the coders on a computer terminal. The reference materials were also on this terminal. Thus, the coders could do nearly all of their work directly from the computer terminal. This computer-assisted coding worked well. It eliminated the arduous task of picking up paper questionnaire work units and paging through the questionnaires looking for entries to code.

As mentioned above, the occupation of persons in the Armed Forces was coded for the first time in 1990. Studies showed that the occupational titles reported by the military often were different from those for civilians. This required the development of an Alphabetical Index of Military Occupations. This was referenced first for members of the Armed Forces. If a description could not be found in the military manual, coders used the regular (civilian) index.

**Classification systems**—The **industry classification system** developed for the 1990 census consisted of 236 categories for employed respondents, classified into 13 major industry groups. Since 1940, the industry classification has been based on the *Standard Industrial Classification (SIC) Manual*. The 1990 census classification was developed from the 1987 SIC Manual published by the Office of Management and Budget.

The SIC was designed primarily to classify establishments by the type of industrial activity in which they were engaged. However, census data, which were collected from households, differed in detail and nature from those obtained from establishment surveys. Therefore, the census classification systems, while defined in SIC terms,

could not reflect the full detail in all categories. There were several levels of industrial classification found in census products. For example, the 1990 CP-2, *Social and Economic Characteristics* report included 46 data lines while the 1990 Summary Tape File 4 (STF 4) presented 72 categories.

The **occupational classification system** developed for the 1990 census consisted of 501 specific occupational categories for employed persons arranged into 6 summary and 13 major occupational groups. This classification was developed to be consistent with the *Standard Occupational Classification (SOC) Manual: 1980*, published by the Office of Federal Statistical Policy and Standards, U.S. Department of Commerce. Tabulations with occupation as the primary characteristic presented several levels of occupational detail. The most detailed tabulations were shown in a special 1990 report and tape files on occupation. These products contained all 501 occupational categories plus industry or class-of-worker subgroupings of occupational categories. Other tabulations and reports showed less detail. For example, the 1990 CP-2, *Social and Economic Characteristics* report included 47 data lines while the 1990 STF 4 had 94 categories.

**Editing and allocation**—The edit first determined whether a respondent was in the universe, which required an industry and occupation code. The codes for the three items were checked to ensure their validity and edited for their relation to each other. Invalid and inconsistent codes were either blanked or changed to consistent ones.

If at least one of the three codes was blank after the edit, a code was assigned from a "similar" person based on other items such as age (5), sex (3), education (11 and 12), residence (14), and weeks worked (31b). If all the work experience (questions 31a, b, c) and income data also were blank, all these economic items were assigned from one other person for whom the census already had all the necessary data.

**Comparability**—Comparability of industry and occupational data between one census and the next is affected by a number of factors. The primary factor was the classification systems used to code questionnaire responses. For both industry and occupation, the basic classification structures were generally the same from 1940 to 1970, but changes in the individual categories limited comparability of the data from one census to another. There was an especially large increase in occupational categories at the time of the 1970 census; the number of categories increased from 297 in 1960 to 429 (plus 12 allocation categories discussed below). These changes were needed to recognize the "birth" of new industries and occupations, the "death" of others, and the desire of analysts and other users for more detail in the presentation of the data.

The largest change in occupation was for the 1980 census. The classification was converted to be compatible to the SOC, the new, and first, U.S. standard of occupations. In that process, some 1970 categories went to several 1980 categories, some in a different major group.

Other whole categories were moved from one major group to another. This made the occupational data collected for 1980 and 1990 less comparable to the earlier classifications. The 1990 occupational classification was very close to that used in 1980.

Minor revisions in the 1990 industrial classification reflected changes made to the 1987 SIC. These included moving some categories to a different major group.

Other factors that affected data comparability included the universe to which the data referred (in 1970, the age cutoff for labor force was changed from 14 years to 16 years); the wording of the industry and occupation questions (for example, important changes were made in 1970); improvements in the coding procedures (the Employer Name List technique was introduced in 1970); and the handling of "not reported" cases. Prior to 1970, they were placed in the residual categories, "Industry not reported" and "Occupation not reported." In 1970, an allocation process was introduced that assigned these cases to major groups. In 1990, as in 1980, the "Not reported" cases were assigned to individual categories. Therefore, the 1980 and 1990 data for individual categories included some numbers of persons who were tabulated in a "Not reported" category in previous censuses.

Comparing 1990 census data to those from 1980 and the Current Population Survey revealed differences not explained by classification changes or changes in the economy. Some of these differences may have been due to part of the work having been coded by the computer. The final census record did not note which codes were assigned by the computer, so this hypothesis has not been proven.

The 1990 census introduced an additional class-of-worker category for "private not-for-profit" employers. This category was a subset of the 1980 category "employee of private employer" so there were no comparable data before 1990.

Comparability between the statistics on industry and occupation from the 1990 census and statistics from other sources was affected by many of the factors described in the employment-status items (21, 25, and 26)—primarily geographic differences between residence and place of work, reference different dates, and differences in counts because of dual job holding. Industry data from publication censuses covered all industries and all kinds of workers, whereas data from establishments in the economic censuses often excluded private household workers, government workers, and the self-employed. Also, the replies from household respondents may have differed in detail and nature from those obtained from establishments.

Occupation data from the census and data from government licensing agencies, professional associations, trade unions, etc., might not be as comparable as expected. Organizational listings often included persons not in the labor force or persons devoting all or most of their time to another occupation, such as a physician whose job was administrator of a hospital. Also, a person might be a member of two or more different professional

organizations. In addition, relatively few organizations, except for those requiring licensing, attained complete coverage of membership in a particular occupational field.

### Question 31. Work Experience

|   |  |
|---|--|
| <p><b>31a. Last year (1989), did this person work, even for a few days, at a paid job or in a business or farm?</b></p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No — Skip to 32</p> |  |
| <p><b>b. How many weeks did this person work in 1989?</b><br/>Count paid vacation, paid sick leave, and military service.</p> <p><input type="text"/> Weeks</p>                                       |  |
| <p><b>c. During the weeks WORKED in 1989, how many hours did this person usually work each week?</b></p> <p><input type="text"/> Hours</p>  |  |

#### Instructions:

**31a.** Look at the instructions for question 21a to see what to count as work.

**b.** Count every week in which the person did any work at all, even for an hour.

Since 1940, the census has included questions on the number of weeks worked during the preceding year. The inquiry about the usual number of hours per week worked in the previous year was new for 1980.

The components of this item constituted the battery of questions on work experience. Item 31a (worked last year) instructed persons who had worked during the previous year to answer the questions on week and hours worked. The number of weeks worked in the previous year (31b) and usual hours worked per week (31c) served, among other uses, as qualifiers for the income and earnings data (see questions 32 and 33 below). Because all income-related information in the census referred to the calendar year before the census was taken (1989), the information on weeks worked and usual hours worked per week in the previous year was necessary to estimate weekly and hourly earnings and to take into account differences in weeks and hours worked when analyzing income and earnings data for various subgroups of the population, such as by race or sex. If the hours worked each week varied considerably, the respondent was instructed to report an approximate average of the number of hours worked per week. Item 31c referred to the usual hours of work. For each component of the question, the 1990 version was identical to that used in 1980.

**Coding**—None was needed.

**Editing and allocation**—The responses to questions 31a, b, and c were edited for consistency among themselves and with the income, industry, occupation, class-of-worker,



employment status, and year last worked items. Missing entries were assigned a value from a person with similar characteristics, in conjunction with allocation for missing entries to items 28 to 32.

### Questions 32 and 33. Income

**32. INCOME IN 1989 —**  
 Fill the "Yes" circle below for each income source received during 1989. Otherwise, fill the "No" circle. If "Yes," enter the total amount received during 1989. For income received jointly, see instruction guide. If exact amount is not known, please give best estimate. If net income was a loss, write "Loss" above the dollar amount.

**a. Wages, salary, commissions, bonuses, or tips from all jobs — Report amount before deductions for taxes, bonds, dues, or other items.**  
 Yes  No  
 \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**b. Self-employment income from own nonfarm business, including proprietorship and partnership — Report NET income after business expenses.**  
 Yes  No  
 \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**c. Farm self-employment income — Report NET income after operating expenses. Include earnings as a tenant farmer or sharecropper.**  
 Yes  No  
 \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**d. Interest, dividends, net rental income or royalty income, or income from estates and trusts — Report even small amounts credited to an account.**  
 Yes  No  
 \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**e. Social Security or Railroad Retirement**  
 Yes  No  
 \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**f. Supplemental Security Income (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments.**  
 Yes  No  
 \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**g. Retirement, survivor, or disability pensions — Do NOT include Social Security.**  
 Yes  No  
 \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**h. Any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony — Do NOT include lump-sum payments such as money from an inheritance or the sale of a home.**  
 Yes  No  
 \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

### Instructions:

- 32.** Fill the **Yes** or **No** circle for each part and enter the amount received during 1989.
- If income from any source was received jointly by household members, report, if possible, the appropriate share for each person; otherwise, report the whole amount for only one person and fill the **No** circle for the other person.
- a.** Include wages and salaries from *all jobs before deductions*. Be sure to include any tips, commissions, or bonuses. Owners of *incorporated* businesses should enter their salary here. Military personnel should include base pay plus cash housing and/or subsistence allowance, flight pay, uniform allotments, reenlistment bonuses, etc.
  - b.** Include *NONFARM* profit (or loss) from self-employment in sole proprietorships and partnerships. *Exclude* profit (or loss) of incorporated businesses you own.
  - c.** Include *FARM* profit (or loss) from self-employment in sole proprietorships and partnerships. *Exclude* profit (or loss) of incorporated farm businesses you own. *Also exclude* amounts from land rented for cash but include amounts from land rented for shares.
  - d.** Include interest received or credited to checking and savings accounts, money market funds, certificates of deposit (CDs), IRAs, KEOGHs, and government bonds.  
 Include dividends received, credited, or reinvested from ownership of stocks or mutual funds.  
 Include profit (or loss) from royalties and the rental of land, buildings or real estate, or from roomers or boarders. Income received by self-employed persons whose *primary* source of income is from renting property or from royalties should be included in questions 32b or 32c above. Include regular payments from an estate or trust fund.
  - e.** Include Social Security (and/or Railroad Retirement) payments to retired persons, to dependents of deceased insured workers, and to disabled workers before Medicare deductions.
  - f.** Include Supplemental Security Income received by aged, blind, or disabled persons, Aid to Families with Dependent Children, or income from other government programs such as general or emergency assistance. Do not include assistance received from private charities. *Exclude* assistance to pay for heating (cooling) costs.
  - g.** Include retirement, disability, or survivor benefits received from companies and unions; Federal, State, and local governments, and the U.S. military. Include regular income from annuities and IRA or KEOGH retirement plans.
  - h.** Include Veterans' (VA) disability compensation and educational assistance payments (VEAP), unemployment compensation, child support or alimony, and all other regular payments such as Armed Forces transfer payments; assistance from private charities; regular contributions from persons not living in the household, etc.
- Do not include the following as income in any item:*
- Refunds or rebates of any kind
  - Withdrawals from savings of any kind
  - Capital gains or losses from the sale of homes, shares of stock, etc.
  - Inheritances or insurance settlements
  - Any type of loan
  - Pay in-kind such as food, free rent, etc.

**33. What was this person's total income in 1989?**  
 Add entries in questions 32a through 32h; subtract any losses. If total amount was a loss, write "Loss" above amount.

None OR  \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

### Instructions. None

Income questions have been asked in each census since 1940. The 1990 inquiry on income sources included instructions followed by eight categories. Each category asked if the respondent had received income from a

specific source the previous year and, if so, to write in the amount from that source in the response box provided. Question 32 covered types of income for persons 15 years old and over, while question 33 called for total income—the sum of all the parts in question 32.

The instructions adopted for the 1990 census were similar to those for 1980, with the elimination of two phrases to reduce wordiness; the reference to income sources b, c, and d in connection with income losses, included in 1980, was dropped.

Component 32a (wages, salary, commissions, or tips from all jobs) measured total money earnings received for work performed as an employee during the previous calendar year.

Item 32b included net money income (gross receipts minus expenses) from one's own business, professional enterprise, or partnership. Gross receipts included the value of all goods sold and services rendered. Expenses included costs of goods purchased, rent, heat, light, power, depreciation charges, wages and salaries paid, business taxes (not personal income taxes), and the like.

Component 32c was for net income (gross receipts minus operating expenses) from the operation of a farm by a person on his/her own account as an owner, renter, or sharecropper. Gross receipts comprised the value of all products sold, government farm programs, money received from the rental of farm equipment to others, and incidental receipts from the sale of wood, sand, gravel, and the like. Operating expenses were such things as the cost of feed, fertilizer, seed, and other farming supplies, cash wages paid to farmhands, depreciation charges, cash rent, interest on farm mortgages, farm building repairs, farm taxes (not State and Federal personal income taxes), and so forth. The value of fuel, food, or other products used for family living were not part of net income.

Part 32d measured property income. It included interest on savings or bonds, dividends from stockholdings or mutual funds, net royalties, net income from rental property to others, receipts from boarders or lodgers, and periodic income from estates and trusts.

Component 32e included Social Security pensions, survivors' benefits and permanent-disability insurance payments made by the Social Security Administration (before deductions for medical insurance), and Railroad Retirement benefit checks from the U.S. Government. "Medicare" reimbursements were not to be reported. The 1990 item was identical to that used in 1980.

Category 32f included Supplemental Security Income (SSI) payments made by Federal or State welfare agencies to low-income persons who were 65 years old or over, blind, or disabled; Aid to Families with Dependent Children (AFDC); and general assistance. It excluded separate payments received for hospital or other medical care (vendor payments). The 1980 census wording of this category was retained for the 1990 census.

Item 32g (retirement, survivor, or disability pensions) was new for 1990. The 1980 census grouped pension income into a category with unemployment compensation,

veterans' payments, alimony or child support, and all other regular sources of income not previously mentioned.

Component 32h asked the respondent to report periodic income other than earnings not covered in the previous income sources. For example, workers' compensation, contributions received periodically from persons not living in the household, military-family allotments, net gambling winnings, and the like were to be reported in this category, along with Veterans Administration (VA—now Department of Veterans' Affairs) payments, unemployment compensation, child support, or alimony. The 1980 version read: "Unemployment compensation, veterans' payments, pensions, alimony or child support, or any other sources of income received regularly." An instruction following began "Exclude lump-sum payments . . ." The 1990 component carried three minor revisions from that of 1980. First, it dropped a reference to pensions and changed "veterans' payments" to "Veterans' (VA) payments." To account for the renaming of the Veterans Administration, the word "Administration" was dropped. Next, the first "or" was deleted to emphasize the distinction between child support and alimony. Third, the instruction was changed from "Exclude" to "DO NOT include lump-sum payments . . ."

Question 33, except for updating the reference year, retained identical wording to that used in 1980.

**Coding**—None was required for these items.

**Editing and allocation**—There were errors of reporting due to the misunderstanding of the income questions such as reporting gross rather than net dollar amounts for the two questions on net self-employment income, which resulted in an overstatement of these items. Another common error was the reporting of identical dollar amounts in two of the eight types of income items where a respondent with only one source of income assumed that the second amount should be entered to represent total income.

The data processing operation instituted extensive computer editing procedures to reduce these reporting errors and to improve the accuracy of the income data. These procedures corrected various reporting deficiencies and improved the consistency of reported income items associated with work experience and information on occupation and class of worker. For example, if a person reported himself or herself as self-employed on his or her own farm, not incorporated, but had reported wage and salary earnings only, the latter amount was shifted to net farm self-employment income. Also, if any respondent reported total income only, the amount was generally assigned to one of the type-of-income items according to responses to the work-experience and class-of-worker questions.

Other types of problems involved data entry or nonreporting of income data. Certain income entries were keyed improperly (e.g., dollars and cents rather than dollars only or amounts with extra digits). The impact of these errors was minimized with computer edits. For missing entries, the Bureau devised procedures to impute appropriate values with either no income or positive or negative dollar amounts for the missing entries.

## POVERTY STATUS

Poverty status was based on responses to the same question as the data on income (see its definitions above). The data referred only to "money income"—1989 pretax money received in 1989, excluding capital gains—and did not include the value of noncash benefits such as employer-provided health insurance, food stamps, or Medicaid. Families or individuals with income below their appropriate poverty threshold (see table 2) were classified as below the poverty level. Those statistics excluded institutionalized persons, college students in dormitories, Armed Forces members in barracks, and unrelated individuals under 15 years of age. Poverty thresholds were updated each year to reflect changes in the consumer price index (CPI).

**Poverty definition**—The Bureau of the Census' poverty statistics are based on a definition developed by the Social Security Administration (SSA) in 1964 and revised in 1969 and 1981 by interagency committees. This definition was established as the official definition of poverty for statistical use in all Executive departments by the Bureau of the Budget (BOB; in circular No. A-46) and later by the Office of Management and Budget (OMB; in Statistical Directive No. 14).

The original index provided a range of income cutoffs adjusted by such factors as family size, sex of the family head, number of children under 18 years old, and farm/nonfarm residence. At the core of this definition was the 1961 economy food plan, the least costly of four nutritionally adequate food plans designed by the Department of Agriculture. Findings from the Department of Agriculture's 1955 survey of food consumption determined that families of three or more persons spent approximately one-third of their income on food; the poverty level for these families therefore was set at three times the cost of the economy food plan. For smaller families and persons living alone, the plan's cost was multiplied by slightly higher factors in order to compensate for the relatively larger fixed expenses

of these smaller households. Annual revisions of these SSA poverty cutoffs were based on price changes of the items in the economy food budget.

In 1969, a Federal interagency committee recommended, and the BOB adopted, two modifications to the original SSA definition of poverty: (1) that the SSA thresholds for nonfarm families be retained for the base year 1963, but that annual adjustments in the levels be based on changes in the CPI rather than on fluctuations in the cost of food included in the economy food plan; and (2) that the farm thresholds be raised from 70 to 85 percent of the corresponding nonfarm levels. The combined impact of these two modifications resulted in an increase of 360,000 poor families and 1.6 million poor persons in 1967.

In 1981, another interagency committee recommended three additional modifications, which the OMB accepted: (1) elimination of separate thresholds for farm families, (2) averaging of thresholds for female-householder and "all other" families, and (3) extension of the poverty matrix to families with nine or more members. The table below shows the poverty threshold matrix in 1989.

**Weighted average thresholds at poverty level**—As shown in the following table, the poverty cutoffs used to determine the poverty status of families and unrelated individuals had 48 thresholds arranged in a two-dimensional matrix consisting of family size (from one person, i.e., unrelated individuals, to nine or more) cross-classified by the presence and number of family members under 18 years old (from zero to eight or more children present). Unrelated individuals and two-person families further were differentiated by the age of the individual or family householder (under 65 years and 65 years and over).

The total income of each family in the sample was tested against the appropriate dollar threshold to determine the poverty status of the family. If the family's total income was less than its corresponding cutoff, the family was classified as below the poverty level. The average thresholds shown in these tables were weighted by the presence and number

Table 2. Poverty Thresholds in 1989, by Size of Family and Number of Related Children Under 18 Years

| Size of family unit                     | Weighted average thresholds (dollars) | Related children under 18 years |        |        |        |        |        |        |        |               |
|---|---------------------------------------|---------------------------------|--------|--------|--------|--------|--------|--------|--------|---------------|
|   |                                       | None                            | One    | Two    | Three  | Four   | Five   | Six    | Seven  | Eight or more |
| One person (unrelated individual) ..... | 6,310                                 |                                 |        |        |        |        |        |        |        |               |
| Under 65 years .....                    | 6,451                                 | 6,451                           |        |        |        |        |        |        |        |               |
| 65 years and over .....                 | 5,947                                 | 5,947                           |        |        |        |        |        |        |        |               |
| Two persons .....                       | 8,076                                 |                                 |        |        |        |        |        |        |        |               |
| Householder under 65 years .....        | 8,343                                 | 8,303                           | 8,547  |        |        |        |        |        |        |               |
| Householder 65 years and over ..        | 7,501                                 | 7,495                           | 8,515  |        |        |        |        |        |        |               |
| Three persons .....                     | 9,885                                 | 9,699                           | 9,981  | 9,990  |        |        |        |        |        |               |
| Four persons .....                      | 12,674                                | 12,790                          | 12,999 | 12,575 | 12,619 |        |        |        |        |               |
| Five persons .....                      | 14,990                                | 15,424                          | 15,648 | 15,169 | 14,798 | 14,572 |        |        |        |               |
| Six persons .....                       | 16,921                                | 17,740                          | 17,811 | 17,444 | 17,092 | 16,569 | 16,259 |        |        |               |
| Seven persons .....                     | 19,162                                | 20,412                          | 20,540 | 20,101 | 19,794 | 19,224 | 18,558 | 17,828 |        |               |
| Eight persons .....                     | 21,328                                | 22,830                          | 23,031 | 22,617 | 22,253 | 21,738 | 21,084 | 20,403 | 20,230 |               |
| Nine or more persons .....              | 25,480                                | 27,463                          | 27,596 | 27,229 | 26,921 | 26,415 | 25,719 | 25,089 | 24,933 | 23,973        |

of children. For a given size of family, the weighted average threshold for that group was obtained by multiplying the threshold for each presence and number-of-children category within the given family size by the number of families in that category. These products were then aggregated across the entire range of presence and number-of-children categories, and the total aggregate was divided by the total number of families in the group to yield the weighted average threshold at the poverty level for that size family.

Because the basic thresholds used to determine the poverty status of families and unrelated individuals were applied to all families and unrelated individuals, the weighted poverty thresholds were derived using all families and unrelated individuals rather than those families and unrelated individuals classified as below the poverty level.

**Ratio of income to poverty level**—Ratios below 1.00 were below the official definition of the poverty level, while those of 1.00 to 1.25 indicated that a family's income was above its threshold. If a family's threshold was \$9,999, a ratio of 1.00 to 1.25 meant its income was between \$10,000 and \$12,500.

**Income deficit**—Income deficit was the difference between the total income of families and unrelated individuals below the poverty level and their respective thresholds. In computing the income deficit, families reporting a net income loss were assigned zero dollars, and the deficit was equal to the poverty threshold. This measure provided an estimate of the amount that would be required to raise the incomes of all poor families and unrelated individuals to their respective poverty thresholds. The income deficit was thus a measure of the degree of impoverishment of a family or unrelated individual. However, the Bureau urged users to exercise caution in comparing the average deficit of families classified by the race or sex of the householder. Because the poverty thresholds were based on family size and composition, apparent differences in the average income deficits, to some extent, could have been a function of the differences in these characteristics. In 1989, the average amount of money needed to raise the incomes of each poor family to its respective poverty threshold was \$4,875, which amounted to a deficit per family member of \$1,374.

**Poverty areas**—Poverty areas were defined in terms of census tracts (in metropolitan areas) or minor civil divisions, such as townships (in nonmetropolitan areas) in which 20 percent or more of the population was below the poverty level in 1989. About 39.1 percent of the Nation's poor lived in areas of high poverty concentration. While the majority (59.0 percent) of the 12.3 million poor poverty area residents lived in central cities, 27.4 percent lived outside metropolitan areas, and 13.7 percent lived in suburban areas.

#### FOR CENSUS USE (FCU) BOX

This box, at the bottom of page 3, appeared only on household questionnaires. It was used by Bureau staff to

verify selected missing and unclear population and housing data from respondents and to record data for vacant units. Some data were strictly for evaluation purposes.

#### Item A. Total persons

| A. Total persons                 |   |
|----------------------------------|---|
| <input type="radio"/>            | 0 |
| <input type="radio"/>            | 1 |
| <input type="radio"/>            | 2 |
| <input type="radio"/>            | 3 |
| <input checked="" type="radio"/> | 4 |
| <input type="radio"/>            | 5 |
| <input type="radio"/>            | 6 |
| <input type="radio"/>            | 7 |
| <input type="radio"/>            | 8 |
| <input type="radio"/>            | 9 |

Item A, used to verify the response to question 1a by comparing it with the count of data-defined individuals (see "Introduction"), first appeared in the census in 1980 as item F.

**Editing and allocation**—To complete item A, an edit clerk compared the number of names listed in question 1a on page 1 to the number of person columns on pages 2 and 3, with a name and/or at least one item filled in questions 2 through 7. If the numbers matched, a census clerk entered the number and filled the corresponding circle in item A; if different, the clerk chose the greater of the two and filled the circles in item A.

#### Item B. Type of Unit

| B. Type of unit                  |  |
|----------------------------------|--|
| Occupied                         | Vacant                                     |
| <input type="radio"/> First form | <input type="radio"/> Regular              |
| <input type="radio"/> Cont'n     | <input type="radio"/> Usual home elsewhere |

This item, introduced in 1970, was used primarily for internal control and for editing other items, such as items C1 and C2 below. Enumerators classified a housing unit as "occupied" if it was the usual place of residence of the persons listed in the response to question 1.

Census takers completed the "Occupied—First form" circle to indicate either that only one form was used because fewer than seven people lived in the housing unit or that this was the first of two or more forms if more than seven people resided there. For households with more than seven people, census staff completed a continuation

questionnaire during telephone or personal-visit field followup (FF) for mail-returned questionnaires or during non-response followup (NRFU). After finishing a continuation questionnaire, the FF or NRFU enumerator filled in the "Occupied—Cont'n" circle in item B and entered "Continuation" above the address label. (For more information on census data collection, see ch. 6.)

The "Vacant—Regular" circle was filled if the housing unit was uninhabited on Census Day. The "Vacant—Usual home elsewhere" (UHE) circle was only filled if *all* of the people living at a particular housing unit on Census Day were staying there temporarily and had a "usual home elsewhere." NRFU enumerators and PO edit staff determined vacant-UHE status from the answer to question 1b on page 1 of the questionnaire. If the UHE circle was filled in question 1b *and* an address was supplied that was different from the one on the questionnaire mailing label, the enumerator filled the "Vacant—UHE" circle in item B.

**Editing and allocation**—For all vacant units, the computer compared the entry in item B with the response in H4 (tenure). A new item, or variable, called "HVAC" was created for three vacant—UHE possibilities: "vacant—owned," "vacant—rented," and "vacant—undetermined". Where the H4 response was owned (with or without a mortgage), HVAC B was edited to "UHE—owner." Where H4 was "Rented for cash" or "Occupied without payment of cash rent," item B changed to "UHE—renter." Where no response appeared for H4, item B was edited to "UHE—undetermined."

### Item C1. Vacancy Status

|  |  |
|--|--|
| <b>C1. Vacancy status</b>                                |  |
| <input type="radio"/> For rent                           | <input type="radio"/> For seas/<br>rec/occ   |
| <input type="radio"/> For sale only                      | <input type="radio"/> For migrant<br>workers |
| <input type="radio"/> Rented or<br>sold, not<br>occupied | <input type="radio"/> Other vacant           |

This item, further classifying vacant units in 1990, was first used in 1940. The 1960 form added a separate category for units held for migratory workers. This category was combined with the 1970 "Seasonal" item and with the 1980 "Held for occasional use" category. The 1980 term "Year-round, occasional use" was combined with "seasonal/migratory" and became "For seas/rec/occ" (for seasonal, recreational, and occasional use) in 1990.

Enumerators filled one circle under "Vacancy status" for every questionnaire for which they entered "Vacant, regular" or "Vacant, usual home elsewhere" in item B and reported the status of the vacant unit as of Census Day by asking a reliable respondent, such as a rental agent, building manager, or neighbor.

Vacant units offered for rent *or* for sale were classified as "For rent," while the "For sale only" units were limited to those lacking a rental option.

Enumerators were to enter "Rented or sold, not occupied" if any money had been paid or agreed upon but the new owner or renter had not yet moved into the unit.

"For seas/rec/occ" included the following types of vacant units: (1) those intended for occupancy during only certain seasons of the year, such as beach cottages, hunting and ski cabins, etc.; (2) those for weekend or other occasional use throughout the year; (3) shared-ownership or time-sharing condominiums; and (4) those held for herders, loggers, fish packers, and other workers *not employed in farm work*.

"For migrant workers" (for migratory/migrant workers) included vacant units intended for migratory workers *employed in farm work* during the crop season. (Work in a cannery, freezer plant, or seed-processing plant was *not* considered to be farm work.)

"Other vacant" included unoccupied units not falling into any of the above categories, such as those held for (1) settlement of an estate, (2) occupancy of a caretaker or janitor, or (3) personal reasons of the owner or renter.

**Editing and allocation**—The computer compared C1 (vacancy status) with H6 (value) and H7a (contract rent). For vacant-regular units, any entry in C1 was accepted if both H6 and H7a were blank. Where C1 and H7a showed no entry but a response was indicated for H6, C1 was edited to "For sale only." Where C1 and H6 were blank but a response was indicated for H7a, C1 was edited to "For rent." Where all three items were blank, C1 was allocated from a preceding vacant unit. For vacant-UHE units, any entry in C1 was accepted; blank C1 was edited to "For seas/rec/occ." For occupied units, blank C1 was accepted while entries were blanked.

### Item C2. Boarded-up Status

|                                     |                          |
|-------------------------------------|--------------------------|
| <b>C2. Is this unit boarded up?</b> |                          |
| <input type="radio"/> Yes           | <input type="radio"/> No |

This item appeared for the first time in the 1980 census and applied only to year-round housing units. The 1990 wording was identical to that for 1980.

In 1990, enumerators completed this item from observation. They were to enter "Yes" if the vacant unit was boarded up. These were generally structures in which the windows and doors were covered by wood, metal, or similar materials to protect the interior or to prevent entry into the building. A given unit in a multiunit structure also may have been boarded up in this way. "No" was to be entered if the vacant unit was not boarded up.

**Editing and allocation**—The computer compared this item with item B (type of unit). For vacant-regular units, any entry in C2 was accepted; blanks were edited to "No." For vacant-UHE units, "No" was accepted; any other entry was edited to "No." For occupied boarded-up units, only blank C2 was accepted.

## Item D. Months Vacant

| D. Months vacant                  |                                   |
|-----------------------------------|-----------------------------------|
| <input type="radio"/> Less than 1 | <input type="radio"/> 6 up to 12  |
| <input type="radio"/> 1 up to 2   | <input type="radio"/> 12 up to 24 |
| <input type="radio"/> 2 up to 6   | <input type="radio"/> 24 or more  |

A question on the duration of vacancy was asked initially in the 1960 housing census on a 25-percent sample basis. In 1990, data were shown for all vacant housing units. In 1980 and 1970, data were shown only for year-round housing units.

In 1990, enumerators calculated the duration of vacancy by subtracting the date the last occupants moved from the unit from the day of the first attempt at enumeration. For never-occupied, newly constructed units, enumerators were to enter the time from the date construction was completed. Construction was considered to be completed when all the exterior windows and doors were installed and final, usable floors were in place. For recently converted or merged units, enumerators reported the time from the date when the conversion or merger was completed. "Conversion" referred to the creation of two or more housing units from fewer units through structural alteration or change in use.

**Editing and allocation**—The computer compared this item with item B (type of unit). For vacant-regular units, any entry in item D was accepted; blank D was allocated from a preceding vacant-regular unit. For vacant-UHE units, "Less than 1" month was accepted; otherwise, D was edited to that. For occupied units, only blank D was accepted.

## Item E. Complete After

| E. Complete after         |                          |                           |       |                                  |
|---------------------------|--------------------------|---------------------------|-------|----------------------------------|
| <input type="radio"/> LR  | <input type="radio"/> TC | <input type="radio"/> QA  | JIC 1 |                                  |
| <input type="radio"/> P/F | <input type="radio"/> RE | <input type="radio"/> I/T |       | <input type="radio"/>            |
| <input type="radio"/> MV  | <input type="radio"/> ED | <input type="radio"/> EN  |       | <input checked="" type="radio"/> |
| -----                     |                          |                           |       |                                  |
| <input type="radio"/> P0  | <input type="radio"/> P3 | <input type="radio"/> P6  |       |                                  |
| <input type="radio"/> P1  | <input type="radio"/> P4 | <input type="radio"/> IA  | JIC 2 |                                  |
| <input type="radio"/> P2  | <input type="radio"/> P5 | <input type="radio"/> SM  |       | <input type="radio"/>            |

This 1990 item was a considerably expanded version of 1980 item E, "Indicators." Crew leaders, enumerators, telephone followup clerks, district office staff, or edit clerks filled the appropriate circles based on the information they obtained (see "Editing and allocation" below).

**Editing and allocation**—Employees in particular positions (e.g., DO staff, crew leaders, or enumerators) filled these circles as appropriate. In general, these codes were used for evaluation purposes. "LR" indicated that the form contained only last-resort data. "P/F" referred to a form the crew leader completed and sent in with less than last-resort

information, including indeterminate occupancy status or number of persons. "MV" was for post-Census Day in-movers who did not complete a census questionnaire at their previous address. "TC" indicated that a followup clerk made contact with the respondent. "RE" meant that reinterview data replaced previously obtained data for the same unit. A blackened "ED" circle indicated that the form had passed the DO's edit tolerances. A completed "QA" circle referred to information obtained during questionnaire assistance, whether by telephone or walk-in. Enumerators filled the "I/T" circle when they acquired census information from a respondent during list/enumerate or nonresponse followup. "EN" suggested that the form was filled or augmented by a field enumerator. The "JIC 1" (just in case) circle singled out questionnaires completed during the primary selection algorithm review, a procedure to review multiple questionnaires received for a particular census DO.

Processing offices used the "P" circles to record the flow (path) assigned to each questionnaire that failed the computer edit. Forms accepted by the computer edit were not candidates for P-circle entry.

By recording the processing flow on the failing forms in an unambiguous manner, procedures could be written that related the review actions taken directly to the "P" codes assigned on the diary listing (see ch. 8). Transferring the codes to the questionnaires also clearly distinguished recycled forms from "first time through" forms, again allowing procedures to be written based on that distinction and indicating the processing flow through which the questionnaire already had gone. "JIC 2" was filled on continuation questionnaires that were completed during the search/match operation for persons added to the census from the Parolee/Probationer Coverage Improvement Program.

"PO" represented questionnaires listed on the diary whose ID numbers were absent, illegible, or invalid. "P1" was used for type 2 and 3 DO questionnaires that had failed the count check and for all type 1 DO forms that failed the count check after they had gone through followup.

A marked "P2" circle indicated type 2 DO mail-returned questionnaires that had failed the computer edit and had not yet gone to followup; "P3" referred to type 1 DO enumerator-returned questionnaires that had not yet gone to followup; and "P4" meant that type 1 DO initial-edit failures had been resolved without a telephone followup attempt. A darkened "P5" circle meant an office clerk had contacted the respondent by telephone following a type 1 DO initial edit failure; "P6" referred to mail- or enumerator-returned questionnaires from type 1 DO's that failed edit and for which telephone contact had not yet been made; "IA" reflected type 2 and type 3 DO and type 1 DO (recycled) forms that failed the P1 edit (count check) but were reviewed and repaired to the greatest possible extent; and "SM" meant the questionnaires were created to add persons into enumerated/data-capture units.

See also chapter 6 for field-enumeration procedures.



## Item F. Coverage

|                          |                          |                         |                          |  |
|--------------------------|--------------------------|-------------------------|--------------------------|--|
| F. Cov.                  |                          |                         |                          |  |
| <input type="radio"/> 1b | <input type="radio"/> 1a | <input type="radio"/> 7 | <input type="radio"/> H1 |  |

New for 1990, this item was coded to indicate questionnaires which initially failed coverage edits.

**Editing and allocation**—For both mail-returned and enumerator-completed forms, edit staff had specific instructions for handling discrepancies in item 1b on page 1. A questionnaire failed edit if the WHUHE circle was filled and either no address or an address that was different from the mailing label appeared in question 1b. The staff circled “1b” on page 1 with a purple-lead pencil, filled item A in the “For Census Use” (FCU) box on page 3, and filled the circle for “1b” in item F. For mail-returned questionnaires, the clerks ignored the unit designation (for example, an apartment number) for city-type addresses (house number/street name) when comparing the response to question 1b with the address label on the front cover.

The count edit included a comparison of the item A value (total persons) with the number of “data-defined” person columns. A “data-defined” person column was a person column with at least two of the six items (2 through 7) filled. The item A value was the greater or common value of the number of persons listed in question 1a and the person columns with at least one entry for name or questions 2 through 7. If the number of data-defined persons did not match the number in item A of the FCU box, the questionnaire failed edit. The clerk printed an “A” in the left-hand corner at the top of page 2 and filled the “1a” circle in item F.

For mailed returned forms, the edit staff failed questionnaires with seven data-defined persons and seven in item A with no continuation. Using a purple-lead pencil, they entered a “7” above the list of names in question 1a, verified that the item A value and number of data-defined persons were both seven, and filled the “7” circle in item F. If more than seven persons should have been listed on the questionnaire, follow-up employees obtained information over the telephone for the remaining persons.

The H1 circle was coded to indicate that the mail return questionnaire had failed the question H1a/H1b edit. A form failed the H1a/H1b edit if either H1a or H1b had the “Yes” circle marked or a write-in entry was present.

## Item G. District Office and Identification

|       |   |   |   |    |   |   |   |                                     |
|-------|---|---|---|----|---|---|---|-------------------------------------|
| G. DO |   |   |   | ID |   |   |   | <input checked="" type="checkbox"/> |
|       |   |   |   |    |   |   |   |                                     |
| 0     | 0 | 0 | 0 | 0  | 0 | 0 | 0 | 0                                   |
| 1     | 1 | 1 | 1 | 1  | 1 | 1 | 1 | 1                                   |
| 2     | 2 | 2 | 2 | 2  | 2 | 2 | 2 | 2                                   |
| 3     | 3 | 3 | 3 | 3  | 3 | 3 | 3 | 3                                   |
| 4     | 4 | 4 | 4 | 4  | 4 | 4 | 4 | 4                                   |
| 5     | 5 | 5 | 5 | 5  | 5 | 5 | 5 | 5                                   |
| 6     | 6 | 6 | 6 | 6  | 6 | 6 | 6 | 6                                   |
| 7     | 7 | 7 | 7 | 7  | 7 | 7 | 7 | 7                                   |
| 8     | 8 | 8 | 8 | 8  | 8 | 8 | 8 | 8                                   |
| 9     | 9 | 9 | 9 | 9  | 9 | 9 | 9 | 9                                   |

The DO code, the first four digits of the first line of the address label, identified the district office area in which the respondent lived. The seven-digit respondent-identification (ID) number was included on the second line of the address.

**Editing and allocation**—For mail-returned questionnaires, edit staff filled item G in the FCU box of nonbar-coded mail returns. They copied the DO and ID numbers from the address label on the front cover, made the appropriate entries, and filled the corresponding circles. For enumerator forms, the DO and ID numbers in the address label on the front cover had to match the ID number in item G. If the entries or filled circles were incorrect in item G, edit staff made the appropriate entries from the label and filled the circles.

### 100-PERCENT HOUSING QUESTIONS

Questions H1 through H7 were asked for all housing units.

#### Question H1. Coverage

|   |
|---|
| <p><b>H1a.</b> Did you leave anyone out of your list of persons for Question 1a on page 1 because you were not sure if the person should be listed — for example, someone temporarily away on a business trip or vacation, a newborn baby still in the hospital, or a person who stays here once in a while and has no other home?</p> <p><input type="radio"/> Yes, please print the name(s) and reason(s). 7</p> <p><input type="radio"/> No</p> <p>-----</p> |
| <p><b>b.</b> Did you include anyone in your list of persons for Question 1a on page 1 even though you were not sure that the person should be listed — for example, a visitor who is staying here temporarily or a person who usually lives somewhere else?</p> <p><input type="radio"/> Yes, please print the name(s) and reason(s). 7</p> <p><input type="radio"/> No</p> <p>-----</p>  |



## Instructions:

- H1a.** Refer to the list of persons you entered in question 1a on page 1. If you left anyone out of your list because you were not sure if the person(s) should be listed, answer question H1a as **Yes**. Then enter the name(s) and reason(s) why you did not list the person(s) on the lines provided. Otherwise, answer question H1a as **No**.
- b.** If you included anyone on your list even though you were not sure that you should list the person(s), answer question H1b as **Yes**. Then enter the name(s) and reason(s) why you listed the person(s) on the lines provided. Otherwise, answer question H1b as **No**.

An inquiry on household coverage has been included in the census since 1970. For 1990, enumerators were instructed to ask both questions H1a and H1b at each occupied housing unit. The purpose of question H1a was to identify persons who were residents of the housing unit but were left off the questionnaire in error. Item H1b was intended to identify persons who were included on the questionnaire in error and should not have been counted at the housing unit. They used the rules for question 1a and a table of residence rules to determine if a person listed for either of these questions was a member of the household. The table indicated that a respondent was to be counted at his or her "usual residence" (defined as the place where the person lived and slept most of the time).

The 1990 item H1a (on persons omitted from item 1a on page 1) was comparable to question H2 in 1980. In 1990, the example "temporarily away on a business trip or vacation" replaced "anyone in Question 1 who is away from home now—for example, on a vacation or in a hospital" used in 1980.

The 1990 question H1b was comparable to question H1 in 1980, which asked about "a lodger who also has another home."

Spaces were provided at the end of each portion of the 1990 inquiry for respondents to write the name(s) of any omitted or temporarily included person(s) and the reason(s) for the entry(ies).

**Editing and allocation**—For enumerator questionnaires, enumerators had instructions to fill the "Yes" circle in H1a, then complete all population questions not already answered for persons determined to be household members for whom the respondent supplied only a name in question 1a. Enumerators listed in question 1a household members omitted from question 1a and completed all population questions for those persons. They crossed out the names of persons determined not to be household members and ascertained whether the persons were visitors with a UHE. For visitors with a UHE, enumerators completed an ICR and wrote the address of the UHE in the space provided in question 2b on the ICR; for persons determined not to be visitors with a UHE, no further action was required. Enumerators then proceeded to question H1b.

For persons the respondent listed with uncertainty, enumerators filled the "Yes" circle and printed the names in H1b; if unsure whether to list the persons, enumerators referred to the rules for question 1a and the table of residence rules in the *Questionnaire Reference Book* (D-561).

If these sources indicated that a person should not have been included on the questionnaire, the enumerator canceled the corresponding person column for the person who was listed in error.

For questionnaires returned by mail, responses to coverage questions H1a and H1b were reviewed by computer and clerically. If the response(s) indicated that the respondent had problems determining whom to include or exclude on the questionnaire (the "Yes" circle was marked or a write-in entry was present for either H1a or H1b), the case was reviewed during telephone followup or by personal visit. If the follow-up clerk determined that a person should have been added to the questionnaire, the clerk completed the appropriate items based on information provided by the respondent. If the clerk determined that a person should not have been listed on the questionnaire, the clerk drew a line through the person's name in question 1a, lined through the name at the top of the person column, filled the cancellation circles under the column, and corrected the item A value.

## Question H2. Units in Structure

- H2.** Which best describes this building? Include all apartments, flats, etc., even if vacant.
- A mobile home or trailer
  - A one-family house detached from any other house
  - A one-family house attached to one or more houses
  - A building with 2 apartments
  - A building with 3 or 4 apartments
  - A building with 5 to 9 apartments
  - A building with 10 to 19 apartments
  - A building with 20 to 49 apartments
  - A building with 50 or more apartments
  - Other

## Instructions:

- H2.** Fill only one circle.

Count all occupied and vacant apartments in the house or building. Do not count stores or office space.

*Detached* means there is open space on all sides, or the house is joined only to a shed or garage. *Attached* means that the house is joined to another house or building by at least one wall that goes from ground to roof. An example of **A one-family house attached to one or more houses** is a house in a row of houses attached to one another.

A mobile home or trailer that has had one or more rooms added or built onto it should be counted as a *one-family detached house*; a porch or shed is not considered a room.

Data from this item provided a physical description of the national housing inventory and were used extensively in cross-classification and analysis.

The census of 1940 was the first to include a question on type of building. The 1990 questionnaire requested the same data as the 1980 question H13, except "Other" replaced the 1980 category "A boat, tent, van, etc." and "apartments" replaced "families." In 1990, the enumerator

asked this question at all occupied housing units and tried to obtain this information about vacant units. The 1980 census collected sample data only.

**Editing and allocation**—In the regular computer edit, any response was accepted; and blanks were allocated from a preceding unit.

### Question H3. Number of Rooms

|   |                               |                                       |
|---|-------------------------------|---------------------------------------|
| <b>H3. How many rooms do you have in this house or apartment?</b>         |                               |                                       |
| Do NOT count bathrooms, porches, balconies, foyers, halls, or half-rooms. |                               |                                       |
| <input type="radio"/> 1 room  | <input type="radio"/> 4 rooms | <input type="radio"/> 7 rooms         |
| <input type="radio"/> 2 rooms   | <input type="radio"/> 5 rooms | <input type="radio"/> 8 rooms         |
| <input type="radio"/> 3 rooms   | <input type="radio"/> 6 rooms | <input type="radio"/> 9 or more rooms |

#### Instructions:

**H3.** Count only whole rooms in your house, apartment, or mobile home used for living purposes, such as living rooms, dining rooms, kitchens, bedrooms, finished recreation rooms, family rooms, etc. Do not count bathrooms, kitchenettes, strip or pullman kitchens, utility rooms, foyers, halls, half-rooms, porches, balconies, unfinished attics, unfinished basements, or other unfinished space used for storage.

The census has inquired about the number of rooms in each housing unit since 1940. Data from this question provided the basis for estimating living space, a basic factor in determining housing needs and developing programs to serve them. In conjunction with the number of persons occupying the housing unit, information derived from this item contributed to the calculation of persons per room, an element in the formula for allocating Federal block grants and an item of major interest to housing-data users.

In 1990, the censal concept of rooms continued unchanged from that for 1980 and 1970—i.e., the number of whole rooms used for living purposes. The 1990 version varied slightly in wording. The question was asked for all units, both occupied and vacant.

**Editing and allocation**—The Bureau accepted answers to any of the H3 categories; for nonresponse, H3 was allocated from a preceding unit with the same pattern of tenure and units in structure.

### Question H4. Tenure

|  |  |
|--|--|
| <b>H4. Is this house or apartment —</b>  |  |
| <input type="radio"/> Owned by you or someone in this household with a mortgage or loan?             |  |
| <input type="radio"/> Owned by you or someone in this household free and clear (without a mortgage)? |  |
| <input type="radio"/> Rented for cash rent?  |  |
| <input type="radio"/> Occupied without payment of cash rent?   |  |

#### Instructions:

**H4.** Housing is owned if the owner or co-owner lives in it. Mark **Owned by you or someone in this household with a mortgage or loan** if the house, apartment, or mobile home is mortgaged or there is a contract to purchase. Mark **Owned by you or someone in this household free and clear (without a mortgage)** if there is no mortgage or other debt. If the house, apartment, or mobile home is owned but the land is rented, mark this question to show the status of the house, apartment, or mobile home.

Mark **Rented for cash rent** if any money rent is paid, even if the rent is paid by persons who are not members of your household, or by a federal, state, or local government agency.

Mark **Occupied without payment of cash rent** if the unit is **not** owned or being bought by the occupants and if money rent is **not** paid or contracted. The unit may be owned by friends or relatives who live elsewhere and who allow occupancy without charge. A house or apartment may be provided as part of wages or salary. Examples are: caretaker's or janitor's house or apartment; parsonages; tenant farmer or sharecropper houses for which the occupants do not pay cash rent; or military housing.

Data from this question provided the count of owner- and renter-occupied units basic to most housing tabulations and analyses. The responses revealed the extent to which the U.S. population attained the goal of widespread home ownership and the degree of geographic, ethnic, and racial variation.

This question has been asked for all occupied units in housing censuses since 1940 and appeared on the population schedules from 1890 through 1930. The 1980 census question (H8) had one ownership category and two rental categories. The single ownership category "Owned or being bought by you or by someone else in this household" was expanded to two categories in 1990 to separate mortgaged units from those without a mortgage.

**Editing and allocation**—Any entry in H4 was accepted. If blank, the computer compared responses to this question with those to H6 (value) and H7a (contract rent). When H6 had a response but H7a did not, H4 was allocated from a preceding owned unit. When H7a had an entry but neither H4 nor H6 did, H4 was edited to "Rented for cash rent." H4 was allocated from a preceding occupied unit when all three items were blank or when H4 was blank and both H6 and H7a showed entries. For sample questionnaires, H4 was checked against items requesting mortgage information to determine whether tenure should be owned "with a mortgage" or owned "free and clear." For vacant units, tenure was blanked.

### Question H5. Value Screener

|  |                          |
|--|--------------------------|
| <i>If this is a ONE-FAMILY HOUSE —</i>   |                          |
| <b>H5a. Is this house on ten or more acres?</b>  |                          |
| <input type="radio"/> Yes  | <input type="radio"/> No |
| <b>b. Is there a business (such as a store or barber shop) or a medical office on this property?</b> |                          |
| <input type="radio"/> Yes  | <input type="radio"/> No |

## Instructions:

- H5a.** Answer H5a and H5b if you live in a one-family house or a mobile home; include only land that you own or rent.
- b.** A business is easily recognized from the outside; for example, a grocery store or barber shop. A medical office is a doctor's or dentist's office regularly visited by patients.

The census requested and tabulated information on the valuation of certain kinds of housing units. For the first time, in the 1940 census, housing units were screened for business activity, and then, in 1970, an acreage screener was added as well. In the 1980 census, data on value (H6 below) were collected for all owner-occupied units, but published primarily for "specified" owner-occupied housing units—single-family houses on less than 10 acres without a commercial establishment or medical office on the property. For vacant for-sale-only units, value was called "sale price asked."

The wording for item H5a of the 1990 screener question was similar to that for 1980. The H5b portion for 1990 differed from the 1980 question, which asked, "Is any part of the property used as a commercial establishment or medical office?"

**Editing and allocation**—The computer compared both parts of this question with H2 (units in structure); for sample questionnaires, H5a (acreage) was also compared with H19a (farm residence). Prior to computer edit, if the H2 response indicated the unit was a mobile home/trailer or a one-family house, no response was given for H5a, and the H19a entry was "Yes," then H5a was marked "No." In the regular edit for both H5a and H5b (commercial establishment), any H5 entry was accepted if H2 was a mobile home/trailer or a one-family house; for nonresponse, H5 was allocated from a preceding unit.

## Question H6. Value of Property

*Answer only if you or someone in this household OWNS OR IS BUYING this house or apartment —*

**H6.** What is the value of this property; that is, how much do you think this house and lot or condominium unit would sell for if it were for sale?

- |  |  |
|--|--|
| <input type="radio"/> Less than \$10,000   | <input type="radio"/> \$70,000 to \$74,999   |
| <input type="radio"/> \$10,000 to \$14,999 | <input type="radio"/> \$75,000 to \$79,999   |
| <input type="radio"/> \$15,000 to \$19,999 | <input type="radio"/> \$80,000 to \$89,999   |
| <input type="radio"/> \$20,000 to \$24,999 | <input type="radio"/> \$90,000 to \$99,999   |
| <input type="radio"/> \$25,000 to \$29,999 | <input type="radio"/> \$100,000 to \$124,999 |
| <input type="radio"/> \$30,000 to \$34,999 | <input type="radio"/> \$125,000 to \$149,999 |
| <input type="radio"/> \$35,000 to \$39,999 | <input type="radio"/> \$150,000 to \$174,999 |
| <input type="radio"/> \$40,000 to \$44,999 | <input type="radio"/> \$175,000 to \$199,999 |
| <input type="radio"/> \$45,000 to \$49,999 | <input type="radio"/> \$200,000 to \$249,999 |
| <input type="radio"/> \$50,000 to \$54,999 | <input type="radio"/> \$250,000 to \$299,999 |
| <input type="radio"/> \$55,000 to \$59,999 | <input type="radio"/> \$300,000 to \$399,999 |
| <input type="radio"/> \$60,000 to \$64,999 | <input type="radio"/> \$400,000 to \$499,999 |
| <input type="radio"/> \$65,000 to \$69,999 | <input type="radio"/> \$500,000 or more      |

## Instructions:

- H6.** If this is a house, include the value of the house, the land it is on, and any other structures on the same property. If the house is owned but the land is rented, estimate the combined value of the house and the land. If this is a condominium unit, estimate the value for your house or apartment including your share of the common elements. If this is a mobile home, include the value of the mobile home and the value of the land. If you rent the land, estimate the value of the rented land and add it to the value of the mobile home.

Forerunners of 1990 questions on financial characteristics of housing units first appeared in 1890 on a supplementary schedule for mortgaged farms and homes. Questions included the market value of the farms or homes and whether they were mortgaged. Questions on value were asked again in 1920 and 1930. In 1960, when 10 value categories, ranging from "Less than \$5,000" to "\$35,000 or more," replaced write-in entries, the question was asked on a 100-percent basis in large cities and on a 25-percent basis elsewhere. In 1970, it was a 100-percent item everywhere, with the top category increased to "\$50,000 or more." A 100-percent question in 1980 carried the prefatory statement, "If you live in a one-family house or a condominium unit which you own or are buying . . ." It then asked for the value and followed the question with an instruction not to answer if the unit was a mobile home or trailer, a house on 10 or more acres, or a house with a commercial establishment or medical office on the property. Value was to be reported in 1 of 24 categories, ranging from "Less than \$10,000" to "\$200,000 or more."

For 1990, the question was asked again on a 100-percent basis of all owner-occupied and vacant-for-sale housing units. It contained a newly worded prefatory statement, "Answer only if you or someone in this household OWNS OR IS BUYING this house or apartment. . . ." The response section was expanded again to include 26 categories, ranging from "Less than \$10,000" to "\$500,000 or more," to accommodate housing price appreciation during the preceding decade.

**Editing and allocation**—The computer compared the entries in this question with those in H2 (units in structure), H4 (tenure), H5a (acreage), and C1 (vacancy status). Owner-occupied and vacant for-sale-only units with an entry in H6 were accepted. For nonresponse, H6 was allocated from a preceding unit with the same units in structure and acreage pattern; all other entries were blanked.

## Question H7. Monthly Rent, Meals Included in Rent

### H7a. Monthly Rent

Answer only if you **PAY RENT** for this house or apartment —

**H7a. What is the monthly rent?**

|                                      |                                       |
|--------------------------------------|---------------------------------------|
| <input type="radio"/> Less than \$80 | <input type="radio"/> \$375 to \$399  |
| <input type="radio"/> \$80 to \$99   | <input type="radio"/> \$400 to \$424  |
| <input type="radio"/> \$100 to \$124 | <input type="radio"/> \$425 to \$449  |
| <input type="radio"/> \$125 to \$149 | <input type="radio"/> \$450 to \$474  |
| <input type="radio"/> \$150 to \$174 | <input type="radio"/> \$475 to \$499  |
| <input type="radio"/> \$175 to \$199 | <input type="radio"/> \$500 to \$524  |
| <input type="radio"/> \$200 to \$224 | <input type="radio"/> \$525 to \$549  |
| <input type="radio"/> \$225 to \$249 | <input type="radio"/> \$550 to \$599  |
| <input type="radio"/> \$250 to \$274 | <input type="radio"/> \$600 to \$649  |
| <input type="radio"/> \$275 to \$299 | <input type="radio"/> \$650 to \$699  |
| <input type="radio"/> \$300 to \$324 | <input type="radio"/> \$700 to \$749  |
| <input type="radio"/> \$325 to \$349 | <input type="radio"/> \$750 to \$999  |
| <input type="radio"/> \$350 to \$374 | <input type="radio"/> \$1,000 or more |

### Instructions:

**H7a.** Report the rent agreed to or contracted for, even if the rent for your house, apartment, or mobile home is unpaid or paid by someone else.

| If rent is paid: | Multiply rent by: | If rent is paid: | Divide rent by: |
|------------------|-------------------|------------------|-----------------|
| By the day       | 30                | 4 times a year   | 3               |
| By the week      | 4                 | 2 times a year   | 6               |
| Every other week | 2                 | Once a year      | 12              |

The data collected on monthly rent (H7a) were for contract rent (i.e., the amount agreed to, or contracted for), regardless of any furnishings, utilities, or services that may have been included. Contract rent has been requested in each census since 1930; however, in 1960, it was collected from all households in large cities and from a 25-percent sample elsewhere. Through 1960, contract rent was reported with a write-in entry that had to be coded; in 1970 14 categories were provided, ranging from "Less than \$30" to "\$300 or more." For 1980, changes in rental costs and experience in the census tests led to an increase in the number of categories to 24, from "Less than \$50" to "\$500 or more." The 1980 question began with the instruction, "If you pay rent for your living quarters—," followed by a request for the amount of rent and a statement directing the respondent to the instruction guide if rent was not paid by the month.

The instruction on who should answer the question was slightly modified from 1980 to read "Answer only if you PAY RENT for this house or apartment," and no mention was made of what to do if rent was not paid by the month. The 1990 question included 26 categories, ranging from "Less than \$80" to "\$1,000 or more."

**Editing and allocation**—The computer compared responses to H7a with those to H4 (tenure) and C1 (vacancy status). For both renter-occupied and vacant-for-rent units where the H4 entry was any response other than "Occupied

without payment of cash rent," any H7a response was accepted. When there was no response, H7a was allocated from a preceding unit with the same units-in-structure pattern.

### H7b. Meals Included in Rent

**b. Does the monthly rent include any meals?**

Yes       No

### Instructions:

**b.** Answer **Yes** if meals are included in the monthly rent payment, or you must contract for meals or a meal plan in order to live in this building.

New for 1990, this item was intended to measure "congregate" housing, considered to be units where the rent included meals. This question was asked of all occupied housing units rented for cash and all vacant housing units for rent at the time of enumeration. The statistics on meals included in rent were published for specified renter-occupied units paying cash rent and specified vacant-for-rent units, both types of which excluded one-family houses on 10 or more acres.

**Editing and allocation**—For renter-occupied units paying cash rent and vacant-for-rent units, any response to H7b was accepted. For owner-occupied units, no cash rent units, and vacant units other than for rent, any entry in H7b was blanked. Blanks were allocated from a preceding unit paying cash rent.

## SAMPLE HOUSING QUESTIONS

### Question H8. Year Householder Moved In

**H8. When did the person listed in column 1 on page 2 move into this house or apartment?**

1989 or 1990

1985 to 1988

1980 to 1984

1970 to 1979

1960 to 1969

1959 or earlier

### Instructions:

**H8.** The person listed in column 1 refers to the person listed in the first column on page 2. This person should be the household member (or one of the members) in whose name the house, apartment, or mobile home is owned, being bought, or rented. If there is no such person, any adult household member can be the person in column 1. Mark when this person last moved into this house, apartment, or mobile home.

Data from this question permit analysis of residential stability and change for different types of places such as central cities and suburbs of metropolitan areas and for individual towns and rural areas. They are used essentially by public and private organizations responsible for serving community needs.

An item on the year the present occupants last moved into the housing unit appeared in the 1960 and 1970 censuses in the population section of the questionnaire and was asked of all persons. The 1980 question identified the year in which the reference person moved into the housing unit by six time periods, beginning with "1949 or earlier," and included the category "Always lived here." For the 1990 census, "Always lived here" was deleted, and the years were updated to reflect movement during the decade 1980 to 1990.

**Editing and allocation**—The computer compared entries for H8 with those for question 5 (age of the householder) for consistency. For occupied units, where a householder's age was less than 20 years and H8 was 1970 through 1990, that response was accepted; where H8 was earlier than 1970, H8 was allocated from a preceding unit with similar age and tenure. Any entry for a householder of 20 to 29 years old with a move-in date from 1960 or later was accepted; any combination before 1960 was allocated from a preceding unit. Any H8 entry for a householder 30 years old and over was accepted; blanks were allocated from a preceding unit with similar age and tenure. For vacant units, blank H8 was accepted; entries were blanked.

### Question H9. Number of Bedrooms

**H9.** How many bedrooms do you have; that is, how many bedrooms would you list if this house or apartment were on the market for sale or rent?

- No bedroom
- 1 bedroom
- 2 bedrooms
- 3 bedrooms
- 4 bedrooms
- 5 or more bedrooms

### Instructions:

**H9.** Include all rooms intended to be used as bedrooms in this house, apartment, or mobile home, even if they are currently being used for other purposes.

Data on number of bedrooms help in assessing present and future housing needs, as well as in analyzing the inventory of both occupied and vacant housing units. When related to household composition, bedroom data offer information on housing adequacy and crowding.

An item on the number of bedrooms has been asked in the census since 1960. The 1980 census asked, "How many bedrooms do you have?" followed by an instruction to count rooms used mainly for sleeping even if also used for other purposes. The 1990 question asked for the

number of bedrooms a person would list if the house or apartment were on the market for sale or rent. Response categories provided for reporting no bedroom or 1, 2, 3, 4, and 5 or more bedrooms.

**Editing and allocation**—The computer compared the entry for H9 with the one for H3 (rooms) for consistency. In general, the unit had to have at least one more room in total than the number of bedrooms, and any unit with three or more rooms was expected to have at least one bedroom. Data for blanks or unacceptable entries in H9 were allocated from preceding units with the same number of rooms and type of structure.

### Question H10. Complete Plumbing Facilities

**H10.** Do you have COMPLETE plumbing facilities in this house or apartment; that is, 1) hot and cold piped water, 2) a flush toilet, and 3) a bathtub or shower?

- Yes, have all three facilities
- No

### Instructions

**H10.** Mark Yes, have all three facilities if you have all the facilities mentioned; all facilities must be in your house, apartment, or mobile home, but not necessarily in the same room. Consider that you have hot water even if you have it only part of the time. Mark No if any of the three facilities is not present.

In 1970, there were separate questions on the presence of hot and cold piped water, bathtub or shower, and flush toilet. In 1980, these three items were combined into a single question on complete plumbing facilities and asked on a 100-percent basis. The 1980 questionnaire included two "yes" categories (one for the exclusive use of the respondent's household, the other for use by another household). The 1980 form also showed two "no" categories (one for having some but not all plumbing facilities, the other for no plumbing at all). The 1990 questionnaire included two response categories ("Yes, have all three facilities" and "No").

This question is a major element in determining the quality of housing. Data from it are used in measuring housing needs and delineating areas in need of assistance. Complete plumbing facilities were defined as consisting of hot and cold piped water, a flush toilet, and a bathtub or shower.

**Editing and allocation**—Any response to H10 was accepted; blanks were allocated from a preceding unit with the same units-in-structure and tenure pattern.

## Question H11. Complete Kitchen Facilities

**H11.** Do you have COMPLETE kitchen facilities; that is, 1) a sink with piped water, 2) a range or cookstove, and 3) a refrigerator?

Yes  
 No

■

### Instructions:

**H11.** The kitchen sink, stove, and refrigerator must be located in the building but do not have to be in the same room. Portable cooking equipment is not considered as a range or cookstove.

Data on the number of housing units without complete kitchen facilities are used with other housing information to identify areas of low-quality housing and to plan and administer housing-assistance and rehabilitation programs. They also are used extensively in connection with programs for low-income persons and older Americans.

Parts of the question on complete kitchen facilities have been on the census questionnaire since 1940. The single-question approach began in 1970.

**Editing and allocation**—Any response to H11 was accepted, and blanks were allocated from a preceding unit with the same units-in-structure and tenure pattern.

## Question H12. Telephone in Housing Unit

**H12.** Do you have a telephone in this house or apartment?

Yes  
 No

### Instructions:

**H12.** Answer **Yes** only if the telephone is located in your house, apartment, or mobile home.

The principal interest in the data from this question concerns access to communication by elderly, handicapped, and low-income persons. Telecommunications and marketing firms are also major users of the data.

A question on the presence of a telephone in the housing unit was asked first in 1980. The 1960 and 1970 censuses included questions on the availability of a telephone, and telephone number at which people living in the unit could be called. Similar questions were included on the

back covers of the 1980 and 1990 forms to enable Bureau employees to interview by telephone if needed to complete or clarify questionnaire entries.

**Editing and allocation**—For occupied units, the computer accepted any response to H12; blanks were allocated from a preceding occupied unit. For vacant units, only blanks were accepted.

## Question H13. Vehicles Available

**H13.** How many automobiles, vans, and trucks of one-ton capacity or less are kept at home for use by members of your household?

None  
 1  
 2  
 3  
 4  
 5  
 6  
 7 or more

■

### Instructions:

**H13.** Count company cars (including police cars and taxicabs) and company trucks of one-ton capacity or less that are regularly kept at home and used by household members for nonbusiness purposes. Do **not** count cars or trucks permanently out of working order.

Data from this item are important for analyzing transportation needs and policies at the national and local governmental levels, and in studies and programs related to energy consumption, environmental protection, area development, and numerous other public- and private-sector applications.

The item on passenger automobiles available for household members' use became a census question in 1960, and light trucks and vans were added in 1980 to become two separate vehicle questions: one on automobiles and one on vans or trucks of 1-ton capacity or less kept at home for use by members of the household. The 1980 questions had printed categories for number of vehicles in single increments from none to three or more.

The 1990 census also had a single combined question, but with printed response categories in single increments from none to seven or more.

**Editing and allocation**—For occupied units, any response to H13 was accepted, and blanks were allocated from a preceding unit with the same units-in-structure and tenure pattern. Only blanks were accepted for vacant units.

## Question H14. Fuel Used Most for House Heating

**H14. Which FUEL is used MOST for heating this house or apartment?**

- Gas: from underground pipes serving the neighborhood
- Gas: bottled, tank, or LP
- Electricity
- Fuel oil, kerosene, etc.
- Coal or coke
- Wood
- Solar energy
- Other fuel
- No fuel used

### Instructions:

**H14.** Fill the circle for the fuel used most to heat your house, apartment, or mobile home. In buildings containing more than one apartment you may obtain this information from the owner, manager, or janitor.

**Solar energy** is provided by a system that collects, stores, and distributes heat from the sun. **Other fuel** includes any fuel not separately listed; for example, purchased steam, fuel briquettes, waste material, etc.

Data from this question are factors in analyzing energy supply and consumption, and for forecasting energy needs and planning programs to meet them. Type of heating fuel used also is a source of information on quality of life and safety as well, since equipment that may be employed with some fuels presents specific risks.

The type of fuel used for house heating has been included in all housing censuses since 1940. In the 1980 census, type of fuel used most for house heating was part of a larger question that also inquired about fuel for water heating and for cooking. These latter two types were not included in the 1990 fuel question. As in 1980, however, a 1990 question on costs of utilities and fuels did ask the cost separately for electricity, gas, and other fuels purchased for all household uses and thus provided some indirect data.

In its final design, the 1990 question had only one important difference from that used in 1980—the addition of solar energy as a heating source.

**Editing and allocation**—For occupied units, any response to H14 was accepted, and blanks were allocated from a preceding unit with the same units-in-structure and tenure pattern. For vacant units, only blanks were accepted.

## Questions H15 and H16. Source of Water and Sewage Disposal

**H15. Do you get water from —**

- A public system such as a city water department, or private company?
- An individual drilled well?
- An individual dug well?
- Some other source such as a spring, creek, river, cistern, etc.?

**H16. Is this building connected to a public sewer?**

- Yes, connected to public sewer
- No, connected to septic tank or cesspool
- No, use other means

### Instructions:

**H15.** If a well provides water for five or more houses, apartments, or mobile homes, mark **A public system**. If a well provides water for four or fewer houses, apartments, or mobile homes, fill one of the circles for **Individual well**.

**Drilled wells**, or small diameter wells, are usually less than 1½ feet in diameter. **Dug wells** are generally hand dug and are larger than 1½ feet wide.

**H16.** A **public sewer** may be operated by a government body or private organization. A **septic tank** or **cesspool** is an underground tank or pit used for disposal of sewage.

Responses to these two questions provided important data in determining accessibility to safe drinking water and in the planning, administration, and evaluation of housing, water, and sewage programs. Housing units may receive their water supply from a number of sources. In the 1990 census, a common source supplying water to five or more units was classified as a "Public system or a private company." If water was supplied from a well serving four or fewer housing units, the units were classified as obtaining water from an individual drilled well or an individual dug well. In the 1980 census, a common source was not considered to be a public system or private company unless it supplied six or more units.

The 1940 census was the first to include items on source of water and sewage disposal. The 1990 question was identical to the one used in 1980.

**Editing and allocation**—For all units, the computer compared entries for H15 and H16 with those for H2 (units in structure). It accepted any response to H15 or H16 where the H2 entry was "A mobile home or trailer," a building with up to four units in it, or "Other." Where H2 indicated five or more units and H15 or H16 was a "public system" (such as a city water department or private company), that response was accepted; other H15 or H16 responses were edited to a public system. If the unit was in a building with less than five units, where no entry was provided, H15 or H16 was allocated from a preceding unit with the same units-in-structure and tenure pattern.



## Question H17. Year Built

### H17. About when was this building first built?

- 1989 or 1990
- 1985 to 1988
- 1980 to 1984
- 1970 to 1979
- 1960 to 1969
- 1950 to 1959
- 1940 to 1949
- 1939 or earlier
- Don't know

### Instructions:

**H17.** Fill the circle corresponding to the period in which the original construction was completed, not the time of any later remodeling, additions, or conversions. In buildings containing more than one apartment, the owner, manager, or janitor may be of help in determining when the building was built.

If you live in a houseboat or a trailer or mobile home, fill the circle corresponding to the model year in which it was manufactured.

If you do not know the period when the building was first constructed, fill the circle for **Don't know**.

This item yielded data on the age of the housing stock found in many types of housing analyses, including those required by Federal legislation. Age of housing data are important in identifying areas of growth and where rehabilitation or substantial renewal are needed. Programs concerned with safety also benefit from analysis involving the periods in which structures were built. One application is in estimating the potential incidence of lead-paint poisoning.

Year built has been included in the census since 1940. The 1980 census question was worded: "About when was this building originally built?" This was followed by a clarifying instruction to answer for the time when the building was first constructed and not when it was remodeled, added to, or converted. There were response circles for seven time periods, ranging from "1979 or 1980" back to "1939 or earlier." The 1990 question added a "Don't know" category for better allocation of responses for respondents who did not know and, otherwise, would guess a year.

**Editing and allocation**—Occupied and vacant units were considered in separate computer edits. For occupied units, H17 was compared with H8 (year householder moved into unit). In general, any entry for H17 was accepted as long as the unit was not reported as being built after the householder moved in; blanks and "Don't know" were allocated from a preceding unit with similar tenure and time the householder moved in. For vacant units, entries were accepted, and blanks were allocated from previous units with similar structure type and vacancy status.

## Question H18. Condominium Status

### H18. Is this house or apartment part of a condominium?

- Yes
- No

*If you live in an apartment building, skip to H20.*

### Instructions:

**H18.** A *condominium* is a type of ownership in which the apartments, houses, or mobile homes in a building or development are individually owned, but the common areas, such as lobbies, halls, etc., are jointly owned. Cooperative occupants should mark **No**.

Data from the item on condominium status expanded tenure information on home ownership. They documented the extent of this form of ownership, which had grown during recent decades.

In 1970, condominiums were grouped with cooperative units, and the data were reported only for owner-occupied cooperatives and condominiums. Beginning in 1980, the census identified all condominium units, whether occupied or vacant. In 1970 and 1980, the question on condominiums was asked on a 100-percent basis. In 1990, it was asked on a sample basis. The 1980 census identified condominium housing units but not cooperatives.

**Editing and allocation**—For all units, the computer compared responses to H18 to those for H2. A "No" response to H18 was accepted when the H2 entry was a mobile home/trailer or "Other"; "Yes" H18 responses were edited to "No." Where H2 was a one-family or multiunit building, any H18 response was accepted; blanks were allocated by similar preceding structure type.

## Question H19. Farm Residence

### H19a. Is this house on less than 1 acre?

- Yes — Skip to H20
- No

**b. In 1989, what were the actual sales of all agricultural products from this property?**

- None
- \$1 to \$999
- \$1,000 to \$2,499
- \$2,500 to \$4,999
- \$5,000 to \$9,999
- \$10,000 or more

## Instructions:

**H19a.** Answer H19a and H19b if you live in a one-family house or mobile home.

- b.** *This property is the acreage on which the house is located; it includes adjoining land you rent for your use. Report sales made in 1989 from this property by you or previous occupants.*

Data identifying farm housing units define the universe of farm housing, the farm residence population, and are important for many programs administered by the Department of Agriculture and other Federal agencies. The 1990 census used the same farm definition as that for 1980. The criteria for the classification of housing units and their occupants as being located on a farm were (1) a lot (or place) size of 1 or more acres and (2) sales of farm products in 1 year of \$1,000 or more.

Farm residence has been included in all censuses since 1890. In 1980, as in 1960 and 1970, the first part of the farm-residence question was a screener to determine the size of the lot or property. The 1980 categories were (1) less than 1 acre (including specific mention of "a city or suburban lot"), (2) 1 to 9 acres, and (3) 10 or more acres. Respondents for housing units located on 1 or more acres were asked the sales value of crops, livestock, and other farm products from the place for the previous year. The lowest value category in 1980 was "Less than \$50 (or None)," with additional categories extending to "\$2,500 or more."

The farm residence question for 1990 included two parts. H19a asked if the house was on less than 1 acre, with an instruction to skip to the next question if "Yes." If "No," the respondent answered H19b, which asked for the value of actual sales of all agricultural products from the property in 1989. Categories included a break at \$1,000 (the minimum value of sales to qualify as a farm) as well as higher values.

**Editing and allocation**—Occupied and vacant units were edited separately, with both pre-edit and edit operations for occupied units. During the pre-edit phase, the computer compared H19a with H5 (dwellings on 10 or more acres) for consistency; disagreements were changed to agree with H5. For both acres (H19a) and sales (H19b), units other than the one-family type and those on less than 1 acre were excluded.

Where the acres category was blank but sales was filled, the computer provided (allocated) a response for acres. If sales contained a dollar-value response (\$1 or more), then part A was made to equal "No" (for 1 or more acres). If sales contained a response of "None," then acres was made "Yes" (for less than 1 acre) and sales was blanked. If sales was blank, acres was allocated from a preceding unit. If an allocated response to the acres item was "No," sales also was allocated.

If the response to the acres item was "Yes" and a dollar-value response was given for sales, the acres entry

was changed to "No," on the assumption that H19a was filled incorrectly. If the preceding conditions did not hold, then the sales entry was blanked because it should not have been answered if the dwelling was on less than 1 acre. If the sales item continued to be a nonresponse, then the sales item was allocated from a preceding unit.

For vacant units, a response only to section a was expected for one-family and mobile-home/trailer dwellings. Blanks were allocated from a preceding unit.

## Question H20. Costs of Utilities and Fuels

**H20.** What are the yearly costs of utilities and fuels for this house or apartment?  
If you have lived here less than 1 year, estimate the yearly cost.

**a. Electricity**

\$  .00  
Yearly cost — Dollars

OR

Included in rent or in condominium fee  
 No charge or electricity not used

---

**b. Gas**

■

\$  .00  
Yearly cost — Dollars

OR

Included in rent or in condominium fee  
 No charge or gas not used

---

**c. Water**

\$  .00  
Yearly cost — Dollars

OR

Included in rent or in condominium fee  
 No charge

---

**d. Oil, coal, kerosene, wood, etc.**

■

\$  .00  
Yearly cost — Dollars

OR

Included in rent or in condominium fee  
 No charge or these fuels not used

## Instructions:

**H20.** If your house or apartment is rented, enter the costs for utilities and fuels **only if you pay for them in addition to the rent entered in H7a.**

If you live in a condominium, enter the costs for utilities and fuels **only if you pay for them in addition to your condominium fee.**

If your fuel and utility costs are already included in your rent or condominium fee, fill the **Included in rent or in condominium fee** circle. Do not enter any dollar amounts.

The amounts to be reported should be the total amount for the past 12 months. Estimate as closely as possible when exact costs are not known. If you have lived in this house or apartment less than 1 year, estimate the yearly cost.

Report amounts even if your bills are unpaid or paid by someone else. If the bills include utilities or fuel used also by another apartment or a business establishment, estimate the amounts for your own house or apartment. If gas and electricity are billed together, enter the combined amount on the electricity line and bracket [ ] the two utilities.

Data on utility and fuel costs are important components of gross rent and homeowner shelter costs, the total out-of-pocket costs borne by renters and homeowners, respectively.

The 1940 census was the first to ask questions on monthly utility and fuel costs, including separate costs of electricity, gas, and water. The 1950 census was the first to cover oil, wood, or coal in the utility and fuel costs question. The 1980 census, the first census collecting these costs for owners as well as for renters, asked for average monthly costs of electricity and gas. Yearly costs were requested for water and, in combined form, for "oil, coal, kerosene, wood, etc." The question called for writing in specific amounts or checking categories if costs were included in rent or not charged, or if the utility was not used.

For 1990, utility and fuel costs again were asked of both owners (including those in condominiums and mobile homes) and renters. All costs were requested on a yearly basis. Persons who had occupied the house or apartment for less than a year were instructed to estimate yearly costs.

**Editing and allocation**—For occupied units, where the H20 amount (part 1) of each component indicated a response but the inclusion section (part 2) did not, the amount was verified with the upper range (see chart below). An amount within the limits was accepted; any amount outside the limits was allocated from a preceding unit, by units in structure and (excluding H20c) fuel type. If both amount and inclusion entries were made, the inclusion section was blanked. Where no amount was noted and either inclusion in rent or no charge for the utility was shown, that response was accepted. If neither an amount nor an inclusion was specified, both were allocated from a preceding unit, by units in structure and (excluding H20c) fuel type.

## Upper-Range Limits for Items H20a through H20d

| Household fuel type (H14)                 | Electricity (H20a) | Gas (H20b) | Water (H20c) | Oil, coal, etc. (H20d) |
|---|--------------------|------------|--------------|------------------------|
| 1, 2 (Gas) . . . . .                      | \$5,000            | \$7,500    | \$5,000      | \$5,000                |
| 3 (Electricity) . . . . .                 | \$7,500            | \$5,000    | \$5,000      | \$5,000                |
| 4, 5, 6 (Oil, coal, wood, etc.) . . . . . | \$5,000            | \$5,000    | \$5,000      | \$7,500                |
| 7, 8 (Solar energy, other fuel) . . . . . | \$5,000            | \$5,000    | \$5,000      | \$7,500                |
| 9 (No fuel used) . . . . .                | \$5,000            | \$5,000    | \$5,000      | \$5,000                |

For vacant units, nonresponse to both sections of each item was accepted. Responses in the inclusion area or for amount were blanked.

## Homeowner Shelter Cost Screener Instructions

### INSTRUCTION:

*Answer questions H21 TO H26, if this is a one-family house, a condominium, or a mobile home that someone in this household OWNS OR IS BUYING; otherwise, go to page 6.*

In determining the content of the 1990 census, the Bureau expanded the section on homeowner shelter cost items by adding new questions and revising some of the 1980 items. In general, homeowner shelter costs for mobile homes and condominiums were added for the first time. This section of the sample questionnaire began with the screener instructions.

In the 1980 census, the section on shelter costs contained questions on real estate taxes, insurance, and mortgages. A statement at the head of that section explained that the questions were to be answered for one-family houses owned or being bought by household members, except mobile homes/trailers, homes on 10 or more acres, condominiums, and houses with a commercial establishment or medical office on the property. Household members in any of the excluded categories and renters were instructed to skip the section. In 1990, the statement explained that the shelter cost items were to be answered "if this were a one-family house, a condominium, or a mobile home that someone in this household OWNS OR IS BUYING."

**Editing and allocation**—In many circumstances where the unit was mortgaged, the shelter cost items (H21 through H26) were edited and allocated as a group. See

"Editing and allocation" under H23 for a description of the procedure covering these situations.

**Upper-Range Limits for Items H21, H22, H23b, and H24b**

| Cell    | Value type | H21 Real estate taxes (3 percent) | H22 Property Insurance (1 percent) | H23b and H24b First and second mortgage payments |
|---------|------------|-----------------------------------|------------------------------------|--|
| 1 ..... | 1          | \$600                             | \$200                              | \$500  |
| 2 ..... | 2          | \$1,500                           | \$500                              | \$1,000  |
| 3 ..... | 3          | \$2,100                           | \$700                              | \$1,500  |
| 4 ..... | 4          | \$3,000                           | \$1,000                            | \$2,000  |
| 5 ..... | 5          | \$4,500                           | \$1,500                            | \$3,000  |
| 6 ..... | 6          | \$6,000                           | \$2,000                            | \$4,000  |
| 7 ..... | 7          | \$9,000                           | \$3,000                            | \$6,000  |
| 8 ..... | 8          | \$15,000                          | \$5,000                            | \$10,000   |
| 9 ..... | 9          | \$15,000                          | \$5,000                            | \$11,000   |

**Editing and allocation**—In many circumstances where the unit was mortgaged, the computer edited and allocated entries for this item in conjunction with the other shelter cost items (H21 through H26). See "Editing and allocation" under H23 for the procedures covering these situations. In other cases, such as when the property was not mortgaged, H21 was edited and allocated independent of the other shelter cost items. For owner-occupied units with an amount in H21, this amount was verified with the upper range limits (see chart under "Homeowner Shelter Cost Screener Instructions" following question H20 discussion), and accepted if within those limits. If outside those limits, or if H21 was blank, H21 was allocated from the preceding owner-occupied unit by unit type and value.

**Question H22. Fire, Hazard, and Flood Insurance**

**Question H21. Real Estate Taxes**

**H21. What were the real estate taxes on THIS property last year?**

\$ .....  
Yearly amount — Dollars

OR

None

■

**H22. What was the annual payment for fire, hazard, and flood insurance on THIS property?**

\$ .....  
Yearly amount — Dollars

OR

None

■

**Instructions:**

**H21.** Report taxes for all taxing jurisdictions (city or town, county, state, school district, etc.) even if they are included in your mortgage payment, not yet paid or paid by someone else, or are delinquent. Do not include taxes past due from previous years.

The 1980 census, the first to include real estate taxes, asked whether they were included in the mortgage payment (H23c) and for the specific amount paid on "this" property, providing space for a write-in response and a circle to fill if no taxes were paid. The 1990 census version was almost identical to that of 1980. The coverage was expanded to include condominiums, mobile homes, and all one-family homes.

**Instructions:**

**H22.** When premiums are paid on other than a yearly basis, convert to a yearly basis. Enter the yearly amount even if no payment was made during the past 12 months.

The 1980 census was the first to have an item on fire and hazard insurance and whether it was included in the mortgage payment (H23d). That question asked for the annual premium for fire and hazard insurance on "this" property, with response space for a write-in amount and a circle to fill if the respondent paid no premium.

**Editing and allocation**—In many circumstances where the unit was mortgaged, the computer edited and allocated responses to H22 in conjunction with those for the other

shelter cost items (H21 through H26). See "Editing and allocation" under H23 for the procedures covering these situations. In other cases, such as when the property was not mortgaged, H22 was edited and allocated independent of the other shelter cost items. For owner-occupied units with an amount in H22, this amount was verified with the upper range limits (see chart under "Homeowner Shelter Cost Screener Instructions" following question H20 discussion), and accepted if within those limits. If outside those limits, or if H22 was blank, H22 was allocated from the preceding owner-occupied unit by unit type and value.

### Question H23. Mortgage Status, Monthly Payment, Taxes and Insurance Included in Monthly Mortgage Payment

**H23a.** Do you have a mortgage, deed of trust, contract to purchase, or similar debt on THIS property?

Yes, mortgage, deed of trust, or similar debt } Go to H23b  
 Yes, contract to purchase }  
 No -- Skip to H24a

---

**b.** How much is your regular monthly mortgage payment on THIS property? Include payment only on first mortgage or contract to purchase.

\$  .00  
 Monthly amount -- Dollars

OR

No regular payment required -- Skip to H24a

---

**c.** Does your regular monthly mortgage payment include payments for real estate taxes on THIS property?

Yes, taxes included in payment  
 No, taxes paid separately or taxes not required

---

**d.** Does your regular monthly mortgage payment include payments for fire, hazard, or flood insurance on THIS property?

Yes, insurance included in payment  
 No, insurance paid separately or no insurance

### Instructions:

- H23a.** The word *mortgage* is used as a general term to indicate all types of loans that are secured by real estate.
- b.** Enter a monthly amount even if it is unpaid or paid by someone else. If the amount is paid on some other periodic basis, see the instructions for H7a to change it to a monthly amount.
- Include payments on first mortgages and contracts to purchase only. Payments for second or junior mortgages and home equity loans should be reported in H24b.

Mortgage status has appeared in every census since 1890, except 1930. The sample question on existence of a mortgage, deed of trust, or contract to purchase the housing unit (H23a) remained essentially the same as in 1980. The 1990 census questionnaire included the 100-percent tenure question (H4) to identify the existence of a mortgage.

The 1980 census contained a multiple-part item on the existence of first and second mortgages and one question on monthly mortgage payments for all mortgages. In 1990, one item asked for the total regular monthly payment to the lender for the first mortgage only while a second item asked for mortgage payments on all second mortgages (including home equity loans). The respondent was to write in a dollar amount or fill a circle indicating that no regular payment was required.

The inclusion of real estate taxes (H23c) in the regular monthly mortgage payment) remained essentially unchanged between 1980 and 1990.

H23d (inclusion of fire, hazard, and flood insurance in regular monthly mortgage payment) was another shelter-cost question that remained essentially the same from 1980 to 1990.

**Editing and allocation**—The answer to item H23a, mortgage status, was accepted if the answer was "No" (not mortgaged) and there were no amounts for first mortgage payment (H23b) or second mortgage payment (H24b); or if the answer was "Yes,..." (mortgaged) and there was an amount or no regular payment answered in either of the mortgage payment questions (H23b or H24b).

If H23a was blank or answered "No" and there was an amount in mortgage payment (H23b or H24b), item H23a was edited to "Yes,..." (mortgaged).

If H23a was answered "Yes,..." , but H23b was blank or above the upper range limit (see chart under "Homeowner Shelter Cost Screener Instructions" following question H20 discussion), the mortgage payment (H23b) was allocated from the preceding mortgaged owner-occupied unit by unit type and value.

A similar procedure for mortgaged units was used to edit and allocate H23c, inclusion of real estate taxes in mortgage payment, and H23d, inclusion of insurance in mortgage payment.

In all other mortgaged unit cases, the computer edited and allocated the responses to items H23a through H23d in conjunction with the other shelter cost items (H21

through H26). This was done because of the close relationship between these items when a property was mortgaged. In these cases, all items were allocated from a preceding mortgaged owner-occupied unit by unit type and value.

**Question H24. Second Mortgage, Home-Equity Loan**

**H24a. Do you have a second or junior mortgage or a home equity loan on THIS property?**

Yes  
 No — *Skip to H25*

■

---

**b. How much is your regular monthly payment on all second or junior mortgages and all home equity loans?**

\$  .00  
 Monthly amount — Dollars

OR

No regular payment required

■

**Instructions:**

- H24a.** A second or junior mortgage or home equity loan is secured by real estate.
- b.** Enter a monthly amount even if it is unpaid or paid by someone else. If the amount is paid on some other periodic basis, see instructions for H7a and change it to a monthly amount. Include payments on all second or junior mortgages or home equity loans.

Monthly payment on second mortgages became a separate item in 1990; persons who responded "Yes" to the 1980 census question on mortgage status were instructed to answer the next item on whether they had a second or junior mortgage. The 1990 inquiry added home-equity loans, recognizing that such loans were becoming an increasingly popular way of "freeing up" the equity in a home.

In the 1980 census, respondents had instructions to include payments on second or junior mortgages in the amount reported for the regular monthly mortgage payment. For 1990, questions on the existence of second or junior mortgages and related home-equity loans and their payments were included separately from those on first mortgages to provide more specific information on home-owner shelter costs.

**Editing and allocation**—In most circumstances, H24a and H24b were edited and allocated in conjunction with the other shelter cost items (H21 through H26). See "Editing and allocation" under H23 for the procedures covering these situations.

If H24b, second mortgage payment, was the only blank or was above the upper range limit (see chart under "Homeowner Shelter Cost Screener Instructions" following question H20 discussion), H24b was allocated from the preceding mortgaged owner-occupied unit by unit type and value.

**Question H25. Monthly Condominium Fee**

*Answer ONLY if this is a CONDOMINIUM —*

**H25. What is the monthly condominium fee?**

\$  .00  
 Monthly amount — Dollars

■

**Instructions:**

- H25.** A *condominium fee* is normally assessed by the condominium owners' association for the purpose of improving and maintaining the common areas. Enter a monthly amount even if it is unpaid or paid by someone else. If the amount is paid on some other periodic basis, see the instructions for H7a on how to change it to a monthly amount.

An inquiry on the monthly condominium fee was introduced in the 1990 census. Preceded by an instruction to answer only if the housing unit was a condominium, the question asked for the amount of the fee.

**Editing and allocation**—In many circumstances where the condominium was mortgaged, the computer edited and allocated responses to H25 in conjunction with the other shelter cost items (H21 through H26). See "Editing and allocation" under H23 for the procedures covering these situations.

In other cases, such as when the condominium was not mortgaged, H25 was edited and allocated independent of the other shelter cost items. For owner-occupied condominiums with an amount in H25, this amount was verified against the upper range limit of \$1,500. If above the limit or if H25 was blank, H25 was allocated from a preceding owner-occupied condominium unit by units in structure.

### Question H26. Mobile Home Costs

Answer *ONLY* if this is a **MOBILE HOME** —

**H26. What was the total cost for personal property taxes, site rent, registration fees, and license fees on this mobile home and its site last year? Exclude real estate taxes.**

\$ \_\_\_\_\_ .00  
Yearly amount — Dollars

#### Instructions:

Historically, mobile homes were considered personal, instead of real, property; therefore, housing shelter cost data were not collected for them. With mobile homes

**H26.** Report amount even if your bills are unpaid or paid by someone else. Include payments for personal property taxes, land or site rent, registration fees and license fees. Do not include real estate taxes already reported in H21. The amount to be reported should be the total amount for an entire 12-month billing period even if made in two or more installments. Estimate as closely as possible when exact costs are not known.

accounting for an increasing proportion of American housing, participants in local public meetings (see ch. 2) and other housing data users recommended asking owners for mobile-home shelter costs in the 1990 census. The 1990 census included a single question, specifying four types of expenses in asking for their total yearly dollar cost.

**Editing and allocation**—In many circumstances where the mobile home was mortgaged, the computer edited and allocated responses to H26 in conjunction with the other shelter cost items (H21 through H26). See “Editing and allocation” under H23 for the procedures covering these situations.

In other cases, such as when the mobile home was not mortgaged, H26 was edited and allocated independent of the other shelter cost items. For owner-occupied mobile homes with an amount in H26, this amount was verified against the upper range limit of \$5,000. If above the limit or if H26 was blank, H26 was allocated from a preceding owner-occupied mobile home.



## APPENDIX 14A.

### Facsimiles of Forms D-2 and D-4

#### **D-2. Official 1990 U.S. Census Form** **D-4. Your Guide for the 1990 U.S. Census Form**

*Form D-2 was the long-form questionnaire used to enumerate a sample of the households in the 1990 census. The cover, page 1, and the back page were essentially the same as their counterparts on the short-form questionnaire (form D-1). In addition to question 1 on page 1, the short form contained only population items 2-7 on page 2 and*

*housing items H1-H7 on page 3. All other questions were unique to the long form. Persons 4-6, not shown, were identical to columns 1, 2, 3, and 7, which are shown. Pages 8-19, used to enumerate persons in columns 2-7, also have been omitted.*

CENSUS '90

# OFFICIAL 1990 U.S. CENSUS FORM



Thank you for taking time to complete and return this census questionnaire. It's important to you, your community, and the Nation.

**The law requires answers but guarantees privacy.**

By law (Title 13, U.S. Code), you're required to answer the census questions to the best of your knowledge. However, the same law guarantees that your census form remains confidential. For 72 years—or until the year 2062—only Census Bureau employees can see your form. No one else—no other government body, no police department, no court system or welfare agency—is permitted to see this confidential information under any circumstances.

**How to get started—and get help.**

Start by listing on the next page the names of all the people who live in your home. Please answer all questions with a black lead pencil. You'll find detailed instructions for answering the census in the enclosed guide. If you need additional help, call the toll-free telephone number to the left, near your address.

**Please answer and return your form promptly.**

Complete your form and return it by April 1, 1990 in the postage-paid envelope provided. Avoid the inconvenience of having a census taker visit your home.

Again, thank you for answering the 1990 Census.  
**Remember: Return the completed form by April 1, 1990.**

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**Para personas de habla hispana -**  
(For Spanish-speaking persons)

Si usted desea un cuestionario del censo en español, llame sin cargo alguno al siguiente número: **1-800-CUENTAN**  
(o sea 1-800-283-6826)

U.S. Department of Commerce  
BUREAU OF THE CENSUS  
FORM D-2

OMB No. 0607-0628  
Approval Expires 07/31/91

The 1990 census must count every person at his or her "usual residence." This means the place where the person lives and sleeps most of the time.

**1a. List on the numbered lines below the name of each person living here on Sunday, April 1, including all persons staying here who have no other home. If EVERYONE at this address is staying here temporarily and usually lives somewhere else, follow the instructions given in question 1b below.**

**Include**

- Everyone who usually lives here such as family members, housemates and roommates, foster children, roomers, boarders, and live-in employees
- Persons who are temporarily away on a business trip, on vacation, or in a general hospital
- College students who stay here while attending college
- Persons in the Armed Forces who live here
- Newborn babies still in the hospital
- Children in boarding schools below the college level
- Persons who stay here most of the week while working even if they have a home somewhere else
- Persons with no other home who are staying here on April 1

**Do NOT include**

- Persons who usually live somewhere else
- Persons who are away in an institution such as a prison, mental hospital, or a nursing home
- College students who live somewhere else while attending college
- Persons in the Armed Forces who live somewhere else
- Persons who stay somewhere else most of the week while working

Print last name, first name, and middle initial for each person. Begin on line 1 with the household member (or one of the household members) in whose name this house or apartment is owned, being bought, or rented. If there is no such person, start on line 1 with any adult household member.

| LAST | FIRST | INITIAL | LAST | FIRST | INITIAL |
|------|-------|---------|------|-------|---------|
| 1    |       |         | 7    |       |         |
| 2    |       |         | 8    |       |         |
| 3    |       |         | 9    |       |         |
| 4    |       |         | 10   |       |         |
| 5    |       |         | 11   |       |         |
| 6    |       |         | 12   |       |         |

**1b. If EVERYONE is staying here only temporarily and usually lives somewhere else, list the name of each person on the numbered lines above, fill this circle  and print their usual address below. DO NOT PRINT THE ADDRESS LISTED ON THE FRONT COVER.**

|                           |  |                  |
|---------------------------|--|------------------|
| House number              | Street or road/Rural route and box number      | Apartment number |
| City                      | State  | ZIP Code         |
| County or foreign country | Names of nearest intersecting streets or roads |                  |

**NOW PLEASE OPEN THE FLAP TO PAGE 2 AND ANSWER ALL QUESTIONS FOR THE FIRST 7 PEOPLE LISTED. USE A BLACK LEAD PENCIL ONLY.**

| Please fill one column for each person listed in Question 1a on page 1.   | PERSON 1   |                | PERSON 2   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
|---|--|----------------|--|----------------|---|---|---|---|---|---|---|---|---|---|---|--|--|---|--|--|--|--|--|--|---|---|---|---|---|---|---|---|---|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|--|--|--|--|---|---|---|---|---|---|---|---|---|---|--|--|---|--|--|--|--|--|--|---|---|---|---|---|---|---|---|---|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|---|---|--|
|   | Last name  |                | Last name  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
|   | First name   | Middle initial | First name   | Middle initial |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| <p><b>2. How is this person related to PERSON 1?</b></p> <p>Fill ONE circle for each person.</p> <p>If Other relative of person in column 1, fill circle and print exact relationship, such as mother-in-law, grandparent, son-in-law, niece, cousin, and so on.</p>  | <p>START in this column with the household member (or one of the members) in whose name the home is owned, being bought, or rented.</p> <p>If there is no such person, start in this column with any adult household member.</p>   |                | <p>If a RELATIVE of Person 1:</p> <p><input type="radio"/> Husband/wife      <input type="radio"/> Brother/sister</p> <p><input type="radio"/> Natural-born or adopted son/daughter      <input type="radio"/> Father/mother</p> <p><input type="radio"/> Stepson/stepdaughter      <input type="radio"/> Grandchild</p> <p><input type="radio"/> Other relative</p> <p>If NOT RELATED to Person 1:</p> <p><input type="radio"/> Roomer, boarder, or foster child      <input type="radio"/> Unmarried partner</p> <p><input type="radio"/> Housemate, roommate      <input type="radio"/> Other nonrelative</p>   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| <p><b>3. Sex</b></p> <p>Fill ONE circle for each person.</p>  | <p><input type="radio"/> Male      <input type="radio"/> Female</p>  |                | <p><input type="radio"/> Male      <input type="radio"/> Female</p>  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| <p><b>4. Race</b></p> <p>Fill ONE circle for the race that the person considers himself/herself to be.</p> <p>If Indian (Amer.), print the name of the enrolled or principal tribe.</p> <p>If Other Asian or Pacific Islander (API), print one group, for example: Hmong, Fijian, Laotian, Thai, Tongan, Pakistani, Cambodian, and so on.</p> <p>If Other race, print race.</p> | <p><input type="radio"/> White</p> <p><input type="radio"/> Black or Negro</p> <p><input type="radio"/> Indian (Amer.) (Print the name of the enrolled or principal tribe.)</p> <p><input type="radio"/> Eskimo</p> <p><input type="radio"/> Aleut</p> <p><u>Asian or Pacific Islander (API)</u></p> <p><input type="radio"/> Chinese      <input type="radio"/> Japanese</p> <p><input type="radio"/> Filipino      <input type="radio"/> Asian Indian</p> <p><input type="radio"/> Hawaiian      <input type="radio"/> Samoan</p> <p><input type="radio"/> Korean      <input type="radio"/> Guamanian</p> <p><input type="radio"/> Vietnamese      <input type="radio"/> Other API</p> <p><input type="radio"/> Other race (Print race)</p> |                | <p><input type="radio"/> White</p> <p><input type="radio"/> Black or Negro</p> <p><input type="radio"/> Indian (Amer.) (Print the name of the enrolled or principal tribe.)</p> <p><input type="radio"/> Eskimo</p> <p><input type="radio"/> Aleut</p> <p><u>Asian or Pacific Islander (API)</u></p> <p><input type="radio"/> Chinese      <input type="radio"/> Japanese</p> <p><input type="radio"/> Filipino      <input type="radio"/> Asian Indian</p> <p><input type="radio"/> Hawaiian      <input type="radio"/> Samoan</p> <p><input type="radio"/> Korean      <input type="radio"/> Guamanian</p> <p><input type="radio"/> Vietnamese      <input type="radio"/> Other API</p> <p><input type="radio"/> Other race (Print race)</p> |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| <p><b>5. Age and year of birth</b></p> <p>a. Print each person's age at last birthday. Fill in the matching circle below each box.</p> <p>b. Print each person's year of birth and fill the matching circle below each box.</p>   | <p>a. Age</p> <table border="1"> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>0</td><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>8</td><td>9</td><td> </td><td> </td></tr> </table>  |                |  |                |   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |  |  | <p>b. Year of birth</p> <table border="1"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>1</td><td>8</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>9</td><td>1</td><td>0</td><td>1</td><td>0</td><td> </td></tr> <tr><td>2</td><td>2</td><td> </td><td>2</td><td>2</td><td> </td></tr> <tr><td>3</td><td>3</td><td> </td><td>3</td><td>3</td><td> </td></tr> <tr><td>4</td><td>4</td><td> </td><td>4</td><td>4</td><td> </td></tr> <tr><td>5</td><td>5</td><td> </td><td>5</td><td>5</td><td> </td></tr> <tr><td>6</td><td>6</td><td> </td><td>6</td><td>6</td><td> </td></tr> <tr><td>7</td><td>7</td><td> </td><td>7</td><td>7</td><td> </td></tr> <tr><td>8</td><td>8</td><td> </td><td>8</td><td>8</td><td> </td></tr> <tr><td>9</td><td>9</td><td> </td><td>9</td><td>9</td><td> </td></tr> </table> |  |  |  |  |  |  | 1 | 8 | 0 | 0 | 0 | 0 | 9 | 1 | 0 | 1 | 0 |  | 2 | 2 |  | 2 | 2 |  | 3 | 3 |  | 3 | 3 |  | 4 | 4 |  | 4 | 4 |  | 5 | 5 |  | 5 | 5 |  | 6 | 6 |  | 6 | 6 |  | 7 | 7 |  | 7 | 7 |  | 8 | 8 |  | 8 | 8 |  | 9 | 9 |  | 9 | 9 |  | <p>a. Age</p> <table border="1"> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>0</td><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>8</td><td>9</td><td> </td><td> </td></tr> </table> |  |  |  |  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |  |  | <p>b. Year of birth</p> <table border="1"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>1</td><td>8</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>9</td><td>1</td><td>0</td><td>1</td><td>0</td><td> </td></tr> <tr><td>2</td><td>2</td><td> </td><td>2</td><td>2</td><td> </td></tr> <tr><td>3</td><td>3</td><td> </td><td>3</td><td>3</td><td> </td></tr> <tr><td>4</td><td>4</td><td> </td><td>4</td><td>4</td><td> </td></tr> <tr><td>5</td><td>5</td><td> </td><td>5</td><td>5</td><td> </td></tr> <tr><td>6</td><td>6</td><td> </td><td>6</td><td>6</td><td> </td></tr> <tr><td>7</td><td>7</td><td> </td><td>7</td><td>7</td><td> </td></tr> <tr><td>8</td><td>8</td><td> </td><td>8</td><td>8</td><td> </td></tr> <tr><td>9</td><td>9</td><td> </td><td>9</td><td>9</td><td> </td></tr> </table> |  |  |  |  |  |  | 1 | 8 | 0 | 0 | 0 | 0 | 9 | 1 | 0 | 1 | 0 |  | 2 | 2 |  | 2 | 2 |  | 3 | 3 |  | 3 | 3 |  | 4 | 4 |  | 4 | 4 |  | 5 | 5 |  | 5 | 5 |  | 6 | 6 |  | 6 | 6 |  | 7 | 7 |  | 7 | 7 |  | 8 | 8 |  | 8 | 8 |  | 9 | 9 |  | 9 | 9 |  |
|   |  |                |  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 0   | 1  | 2              | 3  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 4   | 5  | 6              | 7  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 8   | 9  |                |  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
|   |  |                |  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 1   | 8  | 0              | 0  | 0              | 0 |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 9   | 1  | 0              | 1  | 0              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 2   | 2  |                | 2  | 2              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 3   | 3  |                | 3  | 3              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 4   | 4  |                | 4  | 4              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 5   | 5  |                | 5  | 5              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 6   | 6  |                | 6  | 6              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 7   | 7  |                | 7  | 7              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 8   | 8  |                | 8  | 8              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 9   | 9  |                | 9  | 9              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
|   |  |                |  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 0   | 1  | 2              | 3  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 4   | 5  | 6              | 7  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 8   | 9  |                |  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
|   |  |                |  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 1   | 8  | 0              | 0  | 0              | 0 |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 9   | 1  | 0              | 1  | 0              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 2   | 2  |                | 2  | 2              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 3   | 3  |                | 3  | 3              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 4   | 4  |                | 4  | 4              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 5   | 5  |                | 5  | 5              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 6   | 6  |                | 6  | 6              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 7   | 7  |                | 7  | 7              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 8   | 8  |                | 8  | 8              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| 9   | 9  |                | 9  | 9              |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| <p><b>6. Marital status</b></p> <p>Fill ONE circle for each person.</p>   | <p><input type="radio"/> Now married      <input type="radio"/> Separated</p> <p><input type="radio"/> Widowed      <input type="radio"/> Never married</p> <p><input type="radio"/> Divorced</p>  |                | <p><input type="radio"/> Now married      <input type="radio"/> Separated</p> <p><input type="radio"/> Widowed      <input type="radio"/> Never married</p> <p><input type="radio"/> Divorced</p>  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| <p><b>7. Is this person of Spanish/Hispanic origin?</b></p> <p>Fill ONE circle for each person.</p> <p>If Yes, other Spanish/Hispanic, print one group.</p>   | <p><input type="radio"/> No (not Spanish/Hispanic)</p> <p><input type="radio"/> Yes, Mexican, Mexican-Am., Chicano</p> <p><input type="radio"/> Yes, Puerto Rican</p> <p><input type="radio"/> Yes, Cuban</p> <p><input type="radio"/> Yes, other Spanish/Hispanic (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.)</p>   |                | <p><input type="radio"/> No (not Spanish/Hispanic)</p> <p><input type="radio"/> Yes, Mexican, Mexican-Am., Chicano</p> <p><input type="radio"/> Yes, Puerto Rican</p> <p><input type="radio"/> Yes, Cuban</p> <p><input type="radio"/> Yes, other Spanish/Hispanic (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.)</p>   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |
| <p><b>FOR CENSUS USE</b></p>  | <p><input type="radio"/></p> <p><input type="radio"/></p>  |                | <p><input type="radio"/></p> <p><input type="radio"/></p>  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |   |   |  |

**PERSON 7**

Last name \_\_\_\_\_  
 First name \_\_\_\_\_ Middle initial \_\_\_\_\_

If a RELATIVE of Person 1:

Husband/wife     Brother/sister  
 Natural-born or adopted son/daughter     Father/mother  
 Stepson/stepdaughter     Grandchild  
 Other relative \_\_\_\_\_

If NOT RELATED to Person 1:

Roomer, boarder, or foster child     Unmarried partner  
 Housemate, roommate     Other nonrelative \_\_\_\_\_

Male     Female

White  
 Black or Negro  
 Indian (Amer.) (Print the name of the enrolled or principal tribe.) \_\_\_\_\_  
 Eskimo  
 Aleut  
 Asian or Pacific Islander (API)  
 Chinese     Japanese  
 Filipino     Asian Indian  
 Hawaiian     Samoan  
 Korean     Guamanian  
 Vietnamese     Other API \_\_\_\_\_

Other race (Print race) \_\_\_\_\_

a. Age    b. Year of birth

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | 8 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 9 | 0 | 1 | 0 | 1 | 0 |
| 2 | 0 | 2 | 0 | 2 | 0 | 2 | 0 |   |   |
| 3 | 0 | 3 | 0 | 3 | 0 | 3 | 0 |   |   |
| 4 | 0 | 4 | 0 | 4 | 0 | 4 | 0 |   |   |
| 5 | 0 | 5 | 0 | 5 | 0 | 5 | 0 |   |   |
| 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 |   |   |
| 7 | 0 | 7 | 0 | 7 | 0 | 7 | 0 |   |   |
| 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 |   |   |
| 9 | 0 | 9 | 0 | 9 | 0 | 9 | 0 |   |   |

Now married     Separated  
 Widowed     Never married  
 Divorced

No (not Spanish/Hispanic)  
 Yes, Mexican, Mexican-Am., Chicano  
 Yes, Puerto Rican  
 Yes, Cuban  
 Yes, other Spanish/Hispanic (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.) \_\_\_\_\_

**NOW PLEASE ANSWER QUESTIONS H1a--H26 FOR THIS HOUSEHOLD**

**H1a.** Did you leave anyone out of your list of persons for Question 1a on page 1 because you were not sure if the person should be listed — for example, someone temporarily away on a business trip or vacation, a newborn baby still in the hospital, or a person who stays here once in a while and has no other home?

Yes, please print the name(s) and reason(s). \_\_\_\_\_  
 \_\_\_\_\_

No

**b.** Did you include anyone in your list of persons for Question 1a on page 1 even though you were not sure that the person should be listed — for example, a visitor who is staying here temporarily or a person who usually lives somewhere else?

Yes, please print the name(s) and reason(s). \_\_\_\_\_  
 \_\_\_\_\_

No

**H2.** Which best describes this building? Include all apartments, flats, etc., even if vacant.

A mobile home or trailer  
 A one-family house detached from any other house  
 A one-family house attached to one or more houses  
 A building with 2 apartments  
 A building with 3 or 4 apartments  
 A building with 5 to 9 apartments  
 A building with 10 to 19 apartments  
 A building with 20 to 49 apartments  
 A building with 50 or more apartments  
 Other

**H3.** How many rooms do you have in this house or apartment? Do NOT count bathrooms, porches, balconies, foyers, halls, or half-rooms.

1 room     4 rooms     7 rooms  
 2 rooms     5 rooms     8 rooms  
 3 rooms     6 rooms     9 or more rooms

**H4.** Is this house or apartment —

Owned by you or someone in this household with a mortgage or loan?  
 Owned by you or someone in this household free and clear (without a mortgage)?  
 Rented for cash rent?  
 Occupied without payment of cash rent?

If this is a ONE-FAMILY HOUSE —

**H5a.** Is this house on ten or more acres?

Yes     No

**b.** Is there a business (such as a store or barber shop) or a medical office on this property?

Yes     No

Answer only if you or someone in this household OWNS OR IS BUYING this house or apartment —

**H6.** What is the value of this property; that is, how much do you think this house and lot or condominium unit would sell for if it were for sale?

Less than \$10,000     \$70,000 to \$74,999  
 \$10,000 to \$14,999     \$75,000 to \$79,999  
 \$15,000 to \$19,999     \$80,000 to \$89,999  
 \$20,000 to \$24,999     \$90,000 to \$99,999  
 \$25,000 to \$29,999     \$100,000 to \$124,999  
 \$30,000 to \$34,999     \$125,000 to \$149,999  
 \$35,000 to \$39,999     \$150,000 to \$174,999  
 \$40,000 to \$44,999     \$175,000 to \$199,999  
 \$45,000 to \$49,999     \$200,000 to \$249,999  
 \$50,000 to \$54,999     \$250,000 to \$299,999  
 \$55,000 to \$59,999     \$300,000 to \$399,999  
 \$60,000 to \$64,999     \$400,000 to \$499,999  
 \$65,000 to \$69,999     \$500,000 or more

Answer only if you PAY RENT for this house or apartment —

**H7a.** What is the monthly rent?

Less than \$80     \$375 to \$399  
 \$80 to \$99     \$400 to \$424  
 \$100 to \$124     \$425 to \$449  
 \$125 to \$149     \$450 to \$474  
 \$150 to \$174     \$475 to \$499  
 \$175 to \$199     \$500 to \$524  
 \$200 to \$224     \$525 to \$549  
 \$225 to \$249     \$550 to \$599  
 \$250 to \$274     \$600 to \$649  
 \$275 to \$299     \$650 to \$699  
 \$300 to \$324     \$700 to \$749  
 \$325 to \$349     \$750 to \$999  
 \$350 to \$374     \$1,000 or more

**b.** Does the monthly rent include any meals?

Yes     No

**FOR CENSUS USE**

|                  |  |  |                                   |                                   |                           |                          |    |  |
|------------------|--|--|-----------------------------------|-----------------------------------|---------------------------|--------------------------|----|--|
| A. Total persons | B. Type of unit                                    |  | D. Months vacant                  |                                   | G. DO                     |                          | ID |  |
|                  | Occupied   | Vacant                                     | <input type="radio"/> Less than 1 | <input type="radio"/> 6 up to 12  |                           |                          |    |  |
|                  | <input type="radio"/> First form                   | <input type="radio"/> Regular              | <input type="radio"/> 1 up to 2   | <input type="radio"/> 12 up to 24 |                           |                          |    |  |
|                  | <input type="radio"/> Cont'n                       | <input type="radio"/> Usual home elsewhere | <input type="radio"/> 2 up to 6   | <input type="radio"/> 24 or more  |                           |                          |    |  |
|                  | C1. Vacancy status                                 |  | E. Complete after                 |                                   |                           |                          |    |  |
|                  | <input type="radio"/> For rent                     | <input type="radio"/> For seas/rec/occ     | <input type="radio"/> LR          | <input type="radio"/> TC          | <input type="radio"/> QA  | JIC 1                    |    |  |
|                  | <input type="radio"/> For sale only                | <input type="radio"/> For migrant workers  | <input type="radio"/> P/F         | <input type="radio"/> RE          | <input type="radio"/> I/T |                          |    |  |
|                  | <input type="radio"/> Rented or sold, not occupied | <input type="radio"/> Other vacant         | <input type="radio"/> MV          | <input type="radio"/> ED          | <input type="radio"/> EN  |                          |    |  |
|                  | C2. Is this unit boarded up?                       |  | <input type="radio"/> P0          | <input type="radio"/> P3          | <input type="radio"/> P6  | JIC 2                    |    |  |
|                  | <input type="radio"/> Yes                          | <input type="radio"/> No                   | <input type="radio"/> P1          | <input type="radio"/> P4          | <input type="radio"/> 1A  |                          |    |  |
|                  |  |  | <input type="radio"/> P2          | <input type="radio"/> P5          | <input type="radio"/> SM  |                          |    |  |
|                  |  |  | F. Cov.                           |                                   |                           |                          |    |  |
|                  |  |  | <input type="radio"/> 1b          | <input type="radio"/> 1a          | <input type="radio"/> 7   | <input type="radio"/> H1 |    |  |

|  |  |  |
|--|--|--|
| <p><b>H18.</b> When did the person listed in column 1 on page 2 move into this house or apartment?</p> <p> <input type="radio"/> 1989 or 1990<br/> <input type="radio"/> 1985 to 1988<br/> <input type="radio"/> 1980 to 1984<br/> <input type="radio"/> 1970 to 1979<br/> <input type="radio"/> 1960 to 1969<br/> <input type="radio"/> 1959 or earlier                 </p>  | <p><b>H14.</b> Which FUEL is used MOST for heating this house or apartment?</p> <p> <input type="radio"/> Gas: from underground pipes serving the neighborhood<br/> <input type="radio"/> Gas: bottled, tank, or LP<br/> <input type="radio"/> Electricity<br/> <input type="radio"/> Fuel oil, kerosene, etc.<br/> <input type="radio"/> Coal or coke<br/> <input type="radio"/> Wood<br/> <input type="radio"/> Solar energy<br/> <input type="radio"/> Other fuel<br/> <input type="radio"/> No fuel used                 </p>  | <p><b>H20.</b> What are the yearly costs of utilities and fuels for this house or apartment? If you have lived here less than 1 year, estimate the yearly cost.</p> <p><b>a. Electricity</b></p> <p>\$ <input type="text"/> .00<br/>Yearly cost — Dollars</p> <p>OR</p> <p> <input type="radio"/> Included in rent or in condominium fee<br/> <input type="radio"/> No charge or electricity not used                 </p> |
| <p><b>H19.</b> How many bedrooms do you have; that is, how many bedrooms would you list if this house or apartment were on the market for sale or rent?</p> <p> <input type="radio"/> No bedroom<br/> <input type="radio"/> 1 bedroom<br/> <input type="radio"/> 2 bedrooms<br/> <input type="radio"/> 3 bedrooms<br/> <input type="radio"/> 4 bedrooms<br/> <input type="radio"/> 5 or more bedrooms                 </p> | <p><b>H15.</b> Do you get water from --</p> <p> <input type="radio"/> A public system such as a city water department, or private company?<br/> <input type="radio"/> An individual drilled well?<br/> <input type="radio"/> An individual dug well?<br/> <input type="radio"/> Some other source such as a spring, creek, river, cistern, etc.?                 </p>  | <p><b>b. Gas</b></p> <p>\$ <input type="text"/> .00<br/>Yearly cost — Dollars</p> <p>OR</p> <p> <input type="radio"/> Included in rent or in condominium fee<br/> <input type="radio"/> No charge or gas not used                 </p>   |
| <p><b>H10.</b> Do you have COMPLETE plumbing facilities in this house or apartment; that is, 1) hot and cold piped water, 2) a flush toilet, and 3) a bathtub or shower?</p> <p> <input type="radio"/> Yes, have all three facilities<br/> <input type="radio"/> No                 </p>   | <p><b>H16.</b> Is this building connected to a public sewer?</p> <p> <input type="radio"/> Yes, connected to public sewer<br/> <input type="radio"/> No, connected to septic tank or cesspool<br/> <input type="radio"/> No, use other means                 </p>  | <p><b>c. Water</b></p> <p>\$ <input type="text"/> .00<br/>Yearly cost — Dollars</p> <p>OR</p> <p> <input type="radio"/> Included in rent or in condominium fee<br/> <input type="radio"/> No charge                 </p>   |
| <p><b>H11.</b> Do you have COMPLETE kitchen facilities; that is, 1) a sink with piped water, 2) a range or cookstove, and 3) a refrigerator?</p> <p> <input type="radio"/> Yes<br/> <input type="radio"/> No                 </p>  | <p><b>H17.</b> About when was this building first built?</p> <p> <input type="radio"/> 1989 or 1990<br/> <input type="radio"/> 1985 to 1988<br/> <input type="radio"/> 1980 to 1984<br/> <input type="radio"/> 1970 to 1979<br/> <input type="radio"/> 1960 to 1969<br/> <input type="radio"/> 1950 to 1959<br/> <input type="radio"/> 1940 to 1949<br/> <input type="radio"/> 1939 or earlier<br/> <input type="radio"/> Don't know                 </p>  | <p><b>d. Oil, coal, kerosene, wood, etc.</b></p> <p>\$ <input type="text"/> .00<br/>Yearly cost — Dollars</p> <p>OR</p> <p> <input type="radio"/> Included in rent or in condominium fee<br/> <input type="radio"/> No charge or these fuels not used                 </p>   |
| <p><b>H12.</b> Do you have a telephone in this house or apartment?</p> <p> <input type="radio"/> Yes<br/> <input type="radio"/> No                 </p>  | <p><b>H18.</b> Is this house or apartment part of a condominium?</p> <p> <input type="radio"/> Yes<br/> <input type="radio"/> No                 </p>  |  |
| <p><b>H13.</b> How many automobiles, vans, and trucks of one-ton capacity or less are kept at home for use by members of your household?</p> <p> <input type="radio"/> None<br/> <input type="radio"/> 1<br/> <input type="radio"/> 2<br/> <input type="radio"/> 3<br/> <input type="radio"/> 4<br/> <input type="radio"/> 5<br/> <input type="radio"/> 6<br/> <input type="radio"/> 7 or more                 </p>        | <p><i>If you live in an apartment building, skip to H20.</i></p> <p><b>H19a.</b> Is this house on less than 1 acre?</p> <p> <input type="radio"/> Yes — Skip to H20<br/> <input type="radio"/> No                 </p> <p><b>b.</b> In 1989, what were the actual sales of all agricultural products from this property?</p> <p> <input type="radio"/> None<br/> <input type="radio"/> \$1 to \$999<br/> <input type="radio"/> \$1,000 to \$2,499<br/> <input type="radio"/> \$2,500 to \$4,999<br/> <input type="radio"/> \$5,000 to \$9,999<br/> <input type="radio"/> \$10,000 or more                 </p> |  |

**INSTRUCTION:**

Answer questions H21 TO H26, if this is a one-family house, a condominium, or a mobile home that someone in this household OWNS OR IS BUYING; otherwise, go to page 6.

H21. What were the real estate taxes on THIS property last year?

\$  .00  
Yearly amount — Dollars

OR

None

H22. What was the annual payment for fire, hazard, and flood insurance on THIS property?

\$  .00  
Yearly amount — Dollars

OR

None

H23a. Do you have a mortgage, deed of trust, contract to purchase, or similar debt on THIS property?

- Yes, mortgage, deed of trust, or similar debt
  - Yes, contract to purchase
  - No — Skip to H24a
- } Go to H23b

b. How much is your regular monthly mortgage payment on THIS property? Include payment only on first mortgage or contract to purchase.

\$  .00  
Monthly amount — Dollars

OR

No regular payment required — Skip to H24a

c. Does your regular monthly mortgage payment include payments for real estate taxes on THIS property?

- Yes, taxes included in payment
- No, taxes paid separately or taxes not required

d. Does your regular monthly mortgage payment include payments for fire, hazard, or flood insurance on THIS property?

- Yes, insurance included in payment
- No, insurance paid separately or no insurance

H24a. Do you have a second or junior mortgage or a home equity loan on THIS property?

- Yes
- No — Skip to H25

b. How much is your regular monthly payment on all second or junior mortgages and all home equity loans?

\$  .00  
Monthly amount — Dollars

OR

No regular payment required

Answer ONLY if this is a CONDOMINIUM —  
H25. What is the monthly condominium fee?

\$  .00  
Monthly amount — Dollars

Answer ONLY if this is a MOBILE HOME —  
H26. What was the total cost for personal property taxes, site rent, registration fees, and license fees on this mobile home and its site last year? Exclude real estate taxes.

\$  .00  
Yearly amount — Dollars

Please turn to page 6. ➔

5  
8  
7  
5  
4  
3  
2  
●  
0  
9  
8  
7  
6  
●  
4  
3  
2  
1  
0





**23a. How did this person usually get to work LAST WEEK?** If this person usually used more than one method of transportation during the trip, fill the circle of the one used for most of the distance.

Car, truck, or van       Motorcycle  
 Bus or trolley bus       Bicycle  
 Streetcar or trolley car       Walked  
 Subway or elevated       Worked at home  
 Railroad       Ferryboat       Other method  
 Taxicab       Skip to 28

*If "car, truck, or van" is marked in 23a, go to 23b. Otherwise, skip to 24a.*

**b. How many people, including this person, usually rode to work in the car, truck, or van LAST WEEK?**

Drove alone       5 people  
 2 people       6 people  
 3 people       7 to 9 people  
 4 people       10 or more people

**24a. What time did this person usually leave home to go to work LAST WEEK?**

a.m.  
 p.m.

**b. How many minutes did it usually take this person to get from home to work LAST WEEK?**

Minutes — Skip to 28

**25. Was this person TEMPORARILY absent or on layoff from a job or business LAST WEEK?**

Yes, on layoff  
 Yes, on vacation, temporary illness, labor dispute, etc.  
 No

**26a. Has this person been looking for work during the last 4 weeks?**

Yes  
 No — Skip to 27

**b. Could this person have taken a job LAST WEEK if one had been offered?**

No, already has a job  
 No, temporarily ill  
 No, other reasons (in school, etc.)  
 Yes, could have taken a job

**27. When did this person last work, even for a few days?**

1990       1980 to 1984  
 1989       1979 or earlier  
 1988       Never worked  
 1985 to 1987

*Go to 28*

**28-30. CURRENT OR MOST RECENT JOB ACTIVITY.** Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for his/her last job or business since 1985.

**28. Industry or Employer**

**a. For whom did this person work?** If now on active duty in the Armed Forces, fill this circle  and print the branch of the Armed Forces.

(Name of company, business, or other employer)

**b. What kind of business or industry was this?** Describe the activity at location where employed.

(For example: hospital, newspaper publishing, mail order house, auto engine manufacturing, retail bakery)

**c. Is this mainly — Fill ONE circle**

Manufacturing       Other (agriculture, construction, service, government, etc.)  
 Wholesale trade  
 Retail trade

**29. Occupation**

**a. What kind of work was this person doing?**

(For example: registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, cake icer)

**b. What were this person's most important activities or duties?**

(For example: patient care, directing hiring policies, supervising order clerks, assembling engines, icing cakes)

**30. Was this person — Fill ONE circle**

Employee of a PRIVATE FOR PROFIT company or business or of an individual, for wages, salary, or commissions  
 Employee of a PRIVATE NOT-FOR-PROFIT, tax-exempt, or charitable organization  
 Local GOVERNMENT employee (city, county, etc.)  
 State GOVERNMENT employee  
 Federal GOVERNMENT employee  
 SELF-EMPLOYED in own NOT INCORPORATED business, professional practice, or farm  
 SELF-EMPLOYED in own INCORPORATED business, professional practice, or farm  
 Working WITHOUT PAY in family business or farm

**31a. Last year (1989), did this person work, even for a few days, at a paid job or in a business or farm?**

Yes  
 No — Skip to 32

**b. How many weeks did this person work in 1989?** Count paid vacation, paid sick leave, and military service.

Weeks

**c. During the weeks WORKED in 1989, how many hours did this person usually work each week?**

Hours

**32. INCOME IN 1989 —** Fill the "Yes" circle below for each income source received during 1989. Otherwise, fill the "No" circle. If "Yes," enter the total amount received during 1989. For income received jointly, see instruction guide. If exact amount is not known, please give best estimate. If net income was a loss, write "Loss" above the dollar amount.

**a. Wages, salary, commissions, bonuses, or tips from all jobs — Report amount before deductions for taxes, bonds, dues, or other items.**

Yes  No      \$ .00  
 Annual amount — Dollars

**b. Self-employment income from own nonfarm business, including proprietorship and partnership — Report NET income after business expenses.**

Yes  No      \$ .00  
 Annual amount — Dollars

**c. Farm self-employment income — Report NET income after operating expenses. Include earnings as a tenant farmer or sharecropper.**

Yes  No      \$ .00  
 Annual amount — Dollars

**d. Interest, dividends, net rental income or royalty income, or income from estates and trusts — Report even small amounts credited to an account.**

Yes  No      \$ .00  
 Annual amount — Dollars

**e. Social Security or Railroad Retirement**

Yes  No      \$ .00  
 Annual amount — Dollars

**f. Supplemental Security Income (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments.**

Yes  No      \$ .00  
 Annual amount — Dollars

**g. Retirement, survivor, or disability pensions — Do NOT include Social Security.**

Yes  No      \$ .00  
 Annual amount — Dollars

**h. Any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony — Do NOT include lump-sum payments such as money from an inheritance or the sale of a home.**

Yes  No      \$ .00  
 Annual amount — Dollars

**33. What was this person's total income in 1989?** Add entries in questions 32a through 32h; subtract any losses. If total amount was a loss, write "Loss" above amount.

None OR      \$ .00  
 Annual amount — Dollars

Please turn the page and answer questions for Person 2 listed on page 1. If this is the last person listed in question 1a on page 1, go to the back of the form.

# Your Guide for the 1990 U.S. Census Form

This guide gives helpful information on filling out your census form. If you need more help, call the local U.S. census office. **The telephone number is on the cover of the questionnaire.** After you have filled out your form, please return it in the **envelope** we have provided.

| On the inside                                      | Page        |
|--|-------------|
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CENSUS '90



U.S. DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS

## How to Fill Out Your Census Form

Please use a black lead pencil only. Black lead pencil is better to use than ballpoint or other pens. Most questions ask you to fill in the circle, or to print the information. See **Example** below.

Make sure you print answers for everyone in this household. If someone in the household, such as a roomer or boarder, does not want to give you all the information for the form, print at least the person's name and answer questions 2 and 3. A census taker will call to get the other information directly from the person.

There may be a question you cannot answer exactly. For example, you might not know the age of an elderly person or the price for which your house would sell. Ask someone else in your household; if no one knows, give your best estimate.

Instructions for individual questions begin on page 3 of this guide. They will help you to understand the questions and answer them correctly.

If you have a question about filling out the census form or need assistance, call the local U.S. census office. The telephone number is given on the cover of the questionnaire.

If you do not mail back your census form, a census taker will be sent out to assist you. But it saves time and your taxpayer dollars if you fill out the form yourself and mail it back.

### Example

| a. Age                                   | b. Year of birth  | a. Age                                   | b. Year of birth  |
|--|---|--|---|
| <input checked="" type="radio"/> 0 0 0 0 | <input type="radio"/> 1 <input type="radio"/> 8 <input type="radio"/> 0 <input type="radio"/> 0 0 0 | <input checked="" type="radio"/> 0 9     | <input type="radio"/> 1 <input type="radio"/> 8 <input type="radio"/> 0 0 0 0 |
| <input type="radio"/> 1 0 1 0            | <input checked="" type="radio"/> 9 <input type="radio"/> 1 0 1 0                                    | <input type="radio"/> 1 0 1 0            | <input type="radio"/> 9 <input type="radio"/> 1 0 1 0                         |
| <input type="radio"/> 2 0 2 0            | <input type="radio"/> 2 0 2 0   | <input type="radio"/> 2 0 2 0            | <input type="radio"/> 2 0 2 0   |
| <input type="radio"/> 3 0 3 0            | <input type="radio"/> 3 0 3 0   | <input type="radio"/> 3 0 3 0            | <input type="radio"/> 3 0 3 0   |
| <input type="radio"/> 4 0 4 0            | <input checked="" type="radio"/> 4 0 4 0  | <input type="radio"/> 4 0 4 0            | <input type="radio"/> 4 0 4 0   |
| <input type="radio"/> 5 0 5 0            | <input type="radio"/> 5 0 5 0   | <input type="radio"/> 5 0 5 0            | <input type="radio"/> 5 0 5 0   |
| <input type="radio"/> 6 0 6 0            | <input type="radio"/> 6 0 6 0   | <input type="radio"/> 6 0 6 0            | <input type="radio"/> 6 0 6 0   |
| <input type="radio"/> 7 0 7 0            | <input type="radio"/> 7 0 7 0   | <input type="radio"/> 7 0 7 0            | <input type="radio"/> 7 0 7 0   |
| <input type="radio"/> 8 0 8 0            | <input type="radio"/> 8 0 8 0   | <input type="radio"/> 8 0 8 0            | <input checked="" type="radio"/> 8 0 8 0                                      |
| <input type="radio"/> 9 0 9 0            | <input type="radio"/> 9 0 9 0   | <input checked="" type="radio"/> 9 0 9 0 | <input type="radio"/> 9 0 9 0   |

## Your Answers Are Confidential

The law authorizing the census (Title 13, U.S. Code) also provides that your answers are confidential. No one except census workers may see your completed form and they can be fined and/or imprisoned for any disclosure of your answers. Only after 72 years can your individual census form become available to other government agencies (whether federal, state, county, or local). Until then, no other person or business can see your individual report.

The same law that protects the confidentiality of your answers requires that you provide the information asked in this census to the best of your knowledge.

Information collected from the decennial census is used for a variety of statistical purposes. Census information is used to find out where funding is most needed for schools, health centers, highways, and other services. Census results are used by members of public and private groups—including community organizations—and by businesses and industries, as well as by agencies at all levels of government.

## Instructions for Questions 1a through 7

- List everyone who lives at this address in question 1a. If you are not sure if you should list a person, see the rules on page 1 of the census form. If you are still not sure, answer as best you can and fill in "Yes" for question H1a or H1b, as appropriate.
 

If there are more than seven people in your household, please list all the persons in question 1a, complete the form for seven people, and mail it back in the enclosed envelope. A census taker will call to obtain the information for the additional persons.
- If everyone listed in question 1a usually lives at another address(es), print the address(es) in 1b.
  - Fill one circle to show how each person is related to the person in column 1. If **Other relative** of the person in column 1, print the exact relationship such as son-in-law, daughter-in-law, grandparent, nephew, niece, mother-in-law, father-in-law, cousin, and so on.
 

If the **Stepson/stepdaughter** of the person in column 1 also has been legally adopted by the person in column 1, mark **Stepson/stepdaughter** but do not mark **Natural-born or adopted son/daughter**. In other words, **Stepson/stepdaughter** takes precedence over **Adopted son/daughter**.
  - Fill ONE circle for the race each person considers himself/herself to be.
 

If you fill the **Indian (Amer.)** circle, print the name of the tribe or tribes in which the person is enrolled. If the person is not enrolled in a tribe, print the name of the principal tribe(s).

If you fill the **Other API** circle (under **Asian or Pacific Islander (API)**), only print the name of the group to which the person belongs. For example, the **Other API** category includes persons who identify as Burmese, Fijian, Hmong, Indonesian, Laotian, Bangladeshi, Pakistani, Tongan, Thai, Cambodian, Sri Lankan, and so on.

If you fill the **Other race** circle, be sure to print the name of the race. If the person considers himself/herself to be **White, Black or Negro, Eskimo or Aleut**, fill one circle only. Please do not print the race in the boxes.

The **Black or Negro** category also includes persons who identify as African-American, Afro-American, Haitian, Jamaican, West Indian, Nigerian, and so on.

All persons, regardless of citizenship status, should answer this question.
  - Print age at last birthday in the space provided (print "00" for babies less than 1 year old). Fill in the matching circle below each box. Also, print year of birth in the space provided. Then fill in the matching circle below each box. For an illustration of how to complete question 5, see the **Example** on page 2 of this guide.
  - If the person's only marriage was annulled, mark **Never married**.
  - A person is of Spanish/Hispanic origin if the person's origin (ancestry) is Mexican, Mexican-Am., Chicano, Puerto Rican, Cuban, Argentinean, Colombian, Costa Rican, Dominican, Ecuadoran, Guatemalan, Honduran, Nicaraguan, Peruvian, Salvadoran, from other Spanish-speaking countries of the Caribbean or Central or South America, or from Spain.
 

If you fill the **Yes, other Spanish/Hispanic** circle, print one group. A person who is not of Spanish/Hispanic origin should answer this question by filling the **No (not Spanish/Hispanic)** circle. Note that the term "Mexican-Am." refers only to persons of Mexican origin or ancestry.

All persons, regardless of citizenship status, should answer this question.

## Instructions for Question H1a through H1b

- Refer to the list of persons you entered in question 1a on page 1. If you left anyone out of your list because you were not sure if the person(s) should be listed, answer question H1a as **Yes**. Then enter the name(s) and reason(s) why you did not list the person(s) on the lines provided. Otherwise, answer question H1a as **No**.
  - If you included anyone on your list even though you were not sure that you should list the person(s), answer question H1b as **Yes**. Then enter the name(s) and reason(s) why you listed the person(s) on the lines provided. Otherwise, answer question H1b as **No**.

## Instructions for Questions H2 through H7b

### H2. Fill only one circle.

Count all occupied and vacant apartments in the house or building. Do not count stores or office space.

*Detached* means there is open space on all sides, or the house is joined only to a shed or garage. *Attached* means that the house is joined to another house or building by at least one wall that goes from ground to roof. An example of **A one-family house attached to one or more houses** is a house in a row of houses attached to one another.

A mobile home or trailer that has had one or more rooms added or built onto it should be counted as a *one-family detached house*; a porch or shed is not considered a room.

### H3. Count only whole rooms in your house, apartment, or mobile home used for living purposes, such as living rooms, dining rooms, kitchens, bedrooms, finished recreation rooms, family rooms, etc. Do not count bathrooms, kitchenettes, strip or pullman kitchens, utility rooms, foyers, halls, half-rooms, porches, balconies, unfinished attics, unfinished basements, or other unfinished space used for storage.

### H4. Housing is owned if the owner or co-owner lives in it. Mark **Owned by you or someone in this household with a mortgage or loan** if the house, apartment, or mobile home is mortgaged or there is a contract to purchase. Mark **Owned by you or someone in this household free and clear (without a mortgage)** if there is no mortgage or other debt. If the house, apartment, or mobile home is owned but the land is rented, mark this question to show the status of the house, apartment, or mobile home.

Mark **Rented for cash rent** if any money rent is paid, even if the rent is paid by persons who are not members of your household, or by a federal, state, or local government agency.

Mark **Occupied without payment of cash rent** if the unit is not owned or being bought by the occupants and if money rent is not paid or contracted. The unit may be owned by friends or relatives who live elsewhere and who allow occupancy without charge. A house or apartment may be provided as part of wages or salary. Examples are: caretaker's or janitor's house or apartment; parsonages; tenant farmer or sharecropper houses for which the occupants do not pay cash rent; or military housing.

### H5a. Answer H5a and H5b if you live in a one-family house or a mobile home; include only land that you own or rent.

### b. A business is easily recognized from the outside; for example, a grocery store or barber shop. A medical office is a doctor's or dentist's office regularly visited by patients.

### H6. If this is a house, include the value of the house, the land it is on, and any other structures on the same property. If the house is owned but the land is rented, estimate the combined value of the house and the land. If this is a condominium unit, estimate the value for your house or apartment including your share of the common elements. If this is a mobile home, include the value of the mobile home and the value of the land. If you rent the land, estimate the value of the rented land and add it to the value of the mobile home.

### H7a. Report the rent agreed to or contracted for, even if the rent for your house, apartment, or mobile home is unpaid or paid by someone else.

|                            |                   |                          |                 |
|----------------------------|-------------------|--------------------------|-----------------|
| If rent is paid:           | Multiply rent by: | If rent is paid:         | Divide rent by: |
| By the day . . . . .       | 30                | 4 times a year . . . . . | 3               |
| By the week . . . . .      | 4                 | 2 times a year . . . . . | 6               |
| Every other week . . . . . | 2                 | Once a year . . . . .    | 12              |

### b. Answer **Yes** if meals are included in the monthly rent payment, or you must contract for meals or a meal plan in order to live in this building.

## Instructions for Questions H8 through H19b

### H8. The person listed in column 1 refers to the person listed in the first column on page 2. This person should be the household member (or one of the members) in whose name the house, apartment, or mobile home is owned, being bought, or rented. If there is no such person, any adult household member can be the person in column 1. Mark when this person last moved into this house, apartment, or mobile home.

### H9. Include all rooms intended to be used as bedrooms in this house, apartment, or mobile home, even if they are currently being used for other purposes.

### H10. Mark **Yes, have all three facilities** if you have all the facilities mentioned; all facilities must be in your house, apartment, or mobile home, but not necessarily in the same room. Consider that you have hot water even if you have it only part of the time. Mark **No** if any of the three facilities is not present.

### H11. The kitchen sink, stove, and refrigerator must be located in the building but do not have to be in the same room. Portable cooking equipment is not considered as a range or cookstove.

### H12. Answer **Yes** only if the telephone is located in your house, apartment, or mobile home.

### H13. Count company cars (including police cars and taxicabs) and company trucks of one-ton capacity or less that are regularly kept at home and used by household members for nonbusiness purposes. Do not count cars or trucks permanently out of working order.

### H14. Fill the circle for the fuel used most to heat your house, apartment, or mobile home. In buildings containing more than one apartment you may obtain this information from the owner, manager, or janitor.

**Solar energy** is provided by a system that collects, stores, and distributes heat from the sun. **Other fuel** includes any fuel not separately listed; for example, purchased steam, fuel briquettes, waste material, etc.

### H15. If a well provides water for five or more houses, apartments, or mobile homes, mark **A public system**. If a well provides water for four or fewer houses, apartments, or mobile homes, fill one of the circles for **Individual well**.

**Drilled wells**, or small diameter wells, are usually less than 1½ feet in diameter. **Dug wells** are generally hand dug and are larger than 1½ feet wide.

### H16. A **public sewer** may be operated by a government body or private organization. A **septic tank** or **cesspool** is an underground tank or pit used for disposal of sewage.

### H17. Fill the circle corresponding to the period in which the original construction was completed, not the time of any later remodeling, additions, or conversions. In buildings containing more than one apartment, the owner, manager, or janitor may be of help in determining when the building was built.

If you live in a houseboat or a trailer or mobile home, fill the circle corresponding to the model year in which it was manufactured.

If you do not know the period when the building was first constructed, fill the circle for **Don't know**.

### H18. A **condominium** is a type of ownership in which the apartments, houses, or mobile homes in a building or development are individually owned, but the common areas, such as lobbies, halls, etc., are jointly owned. Cooperative occupants should mark **No**.

### H19a. Answer H19a and H19b if you live in a one-family house or mobile home.

### b. **This property** is the acreage on which the house is located; it includes adjoining land you rent for your use. Report sales made in 1989 from this property by you or previous occupants.

## Instructions for Questions H20 through H26

**H20.** If your house or apartment is rented, enter the costs for utilities and fuels **only if you pay for them in addition to the rent entered in H7a.**

If you live in a condominium, enter the costs for utilities and fuels **only if you pay for them in addition to your condominium fee.**

If your fuel and utility costs are already included in your rent or condominium fee, fill the **Included in rent or in condominium fee** circle. Do not enter any dollar amounts.

The amounts to be reported should be the total amount for the past 12 months. Estimate as closely as possible when exact costs are not known. If you have lived in this house or apartment less than 1 year, estimate the yearly cost.

Report amounts even if your bills are unpaid or paid by someone else. If the bills include utilities or fuel used also by another apartment or a business establishment, estimate the amounts for your own house or apartment. If gas and electricity are billed together, enter the combined amount on the electricity line and bracket [ ] the two utilities.

**H21.** Report taxes for all taxing jurisdictions (city or town, county, state, school district, etc.) even if they are included in your mortgage payment, not yet paid or paid by someone else, or are delinquent. Do not include taxes past due from previous years.

**H22.** When premiums are paid on other than a yearly basis, convert to a yearly basis. Enter the yearly amount even if no payment was made during the past 12 months.

**H23a.** The word *mortgage* is used as a general term to indicate all types of loans that are secured by real estate.

**b.** Enter a monthly amount even if it is unpaid or paid by someone else. If the amount is paid on some other periodic basis, see the instructions for H7a to change it to a monthly amount.

Include payments on first mortgages and contracts to purchase only. Payments for second or junior mortgages and home equity loans should be reported in H24b.

**H24a.** A second or junior mortgage or home equity loan is secured by real estate.

**b.** Enter a monthly amount even if it is unpaid or paid by someone else. If the amount is paid on some other periodic basis, see instructions for H7a and change it to a monthly amount. Include payments on all second or junior mortgages or home equity loans.

**H25.** A *condominium fee* is normally assessed by the condominium owners' association for the purpose of improving and maintaining the common areas. Enter a monthly amount even if it is unpaid or paid by someone else. If the amount is paid on some other periodic basis, see the instructions for H7a on how to change it to a monthly amount.

**H26.** Report amount even if your bills are unpaid or paid by someone else. Include payments for personal property taxes, land or site rent, registration fees and license fees. Do not include real estate taxes already reported in H21. The amount to be reported should be the total amount for an entire 12-month billing period even if made in two or more installments. Estimate as closely as possible when exact costs are not known.

## Instructions for Question 8

**8.** For persons born in the United States:

Print the name of the State in which this person was born. If the person was born in Washington, D.C., print District of Columbia. If the person was born in a U.S. territory or commonwealth, print Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, or Northern Marianas.

For persons born outside the United States:

Print the name of the foreign country or area where the person was born. Use current boundaries, not boundaries at the time of the person's birth. Specify whether Northern Ireland or the Republic of Ireland (Eire); East or West Germany; North or South Korea; England, Scotland, or Wales (not Great Britain or United Kingdom). Specify the particular country or island in the Caribbean (not, for example, West Indies).

## Instructions for Questions 9 through 13

**9.** A person should fill the **Yes, U.S. citizen by naturalization** circle only if he/she has completed the naturalization process and is now a United States citizen. If the person was born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas, he/she should fill the **Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas** circle. If the person was born outside the United States (or at sea) and has at least one American parent, he/she should fill the **Yes, born abroad of American parent or parents** circle.

**10.** If the person has entered the United States (that is, the 50 states and the District of Columbia) more than once, fill the circle for the latest year he/she came to stay.

**11.** Do not include enrollment in a trade or business school, company training, or tutoring unless the course would be accepted for credit at a regular elementary school, high school, or college.

A *public school* is any school or college that is controlled and supported primarily by a local, county, State, or Federal Government. Schools are private if supported and controlled primarily by religious organizations or other private groups.

**12.** Mark the category for the highest grade or level of schooling the person has **successfully completed** or the **highest degree** the person received. If the person is enrolled in school, mark the category containing the highest grade completed (the grade previous to the grade in which enrolled). Schooling completed in foreign or ungraded schools should be reported as the equivalent level of schooling in the regular American school system.

Persons who completed high school by passing an equivalency test, such as the General Educational Development (GED) examination, and did not attend college, should fill the circle for high school graduate.

Do not include vocational certificates or diplomas from vocational, trade, or business schools or colleges unless they were college level associate degrees or higher.

Some examples of *professional school degrees* include medicine, dentistry, chiropractic, optometry, osteopathic medicine, pharmacy, podiatry, veterinary medicine, law, and theology. Do not include barber school, cosmetology, or other training for a specific trade.

Do not include honorary degrees awarded by colleges and universities to individuals for their accomplishments. Include only "earned" degrees.

**13.** Print the ancestry group. Ancestry refers to the person's ethnic origin or descent, "roots," or heritage. Ancestry also may refer to the country of birth of the person or the person's parents or ancestors before their arrival in the United States. All persons, regardless of citizenship status, should answer this question.

Persons who have more than one origin and cannot identify with a single ancestry group may report two ancestry groups (for example, German-Irish).

Be specific. For example, print whether West Indian, Asian Indian, or American Indian. West Indian includes persons whose ancestors came from Jamaica, Trinidad, Haiti, etc. Distinguish Cape Verdean from Portuguese; French Canadian from Canadian; and Dominican Republic from Dominica Island.

A religious group should not be reported as a person's ancestry.

## Instructions for Questions 14a through 19

**14a.** Mark **Yes** if this person lived in this same house or apartment on April 1, 1985, even if he/she moved away and came back since then. Mark **No** if this person lived in the same building but in a different apartment (or in the same mobile home or trailer but on a different lot or trailer site).

**b.** If this person lived in a different house or apartment on April 1, 1985, give the location of this person's usual home at that time.

### Part (1)

If the person lived in the United States on April 1, 1985, print the name of the State (or District of Columbia) where he or she lived. Continue with parts (2) through (4).

If the person lived in a U.S. territory or commonwealth, print the name of the territory or commonwealth, such as Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, or Northern Marianas. Then go to question 15a.

If the person lived outside the United States, print the name of the foreign country or area where he or she lived. Specify whether Northern Ireland or the Republic of Ireland (Eire); East or West Germany; North or South Korea; England, Scotland or Wales (not Great Britain or United Kingdom). Specify the particular country or island in the Caribbean (not, for example, West Indies). Then go to question 15a.

### Part (2)

If the person lived in Louisiana, print the parish name. If the person lived in Alaska, print the borough name. If the person lived in New York city and the county name is not known, print the borough name. If the person lived in an independent city (not in any county) or in Washington, D.C., leave blank and enter the city name in part (3).

### Part (3)

If the person lived in New England, print the name of the town rather than the village name, unless the name of the town is not known. If the person lived outside the limits or boundaries of any city or town, print the name of the post office or the nearest town and mark **No**, **lived outside the city/town limits** in part (4).

### Part (4)

Mark **Yes** if the location is now inside the city/town limits even if it was not inside the limits on April 1, 1985; that is, if the area was annexed by the city/town since that time.

**15.** Mark **Yes** if the person sometimes or always speaks a language other than English at home.

Do not mark **Yes** for a language spoken only at school or if speaking is limited to a few expressions or slang.

Print the name of the language spoken at home. If this person speaks more than one non-English language and cannot determine which is spoken more often, report the first language the person learned to speak.

**17a.** For a person with service in the National Guard or a military reserve unit, fill one of the two **Yes, active duty** circles if and only if the person has ever been called up for active duty other than training; otherwise, mark **Yes, service in Reserves or National Guard only**. For a person whose only service was as a civilian employee or volunteer for the Red Cross, USO, Public Health Service, or War or Defense Department, mark **No**. Count **World War II Merchant Marine Seaman service as active duty**; do not count other Merchant Marine service as active duty.

**18.** Mark **Yes** to part (a) if a health condition substantially limits this person in his or her choice of occupation or if the condition limits the amount of work that can be accomplished in a given period of time. Mark **Yes** to part (b) if the health condition prevents this person from holding any significant employment.

**19.** Consider a person to have difficulty with these activities if any of the following situations apply: (1) it takes extra time or extra effort for the person to perform one or more of the activities, (2) there are times when the person cannot perform one or more of the activities, or (3) the person is completely unable to perform one or more of the activities.

## Instructions for Questions 20 through 23b

**20.** Count all children born alive, including any who have died (even shortly after birth) or who no longer live with you. Do not include miscarriages or stillborn children or any adopted, foster, or stepchildren.

**21a.** Count as work — Mark **Yes**:

- Work for someone else for wages, salary, piece rate, commission, tips, or payments "in kind" (for example, food, lodging received as payment for work performed).
- Work in own business, professional practice, or farm.
- Any work in a family business or farm, paid or not.
- Any part-time work including babysitting, paper routes, etc.
- Active duty in Armed Forces.

Do not count as work — Mark **No**:

- Housework or yard work at home.
- Unpaid volunteer work.
- School work.
- Work done as a resident of an institution.

**22a.** Include the street type (for example, St., Road, Ave.) and the street direction (if a direction such as "North" is part of the address). For example, print 1239 N. Main St. or 1239 Main St., N.W. not just 1239 Main.

If the only known address is a post office box, give a description of the work location. For example, print the name of the building or shopping center where the person works, the nearest intersection, the nearest street where the workplace is located, etc. DO NOT GIVE A POST OFFICE BOX NUMBER.

If the person worked at a military installation or military base that has no street address, report the name of the military installation or base.

If the person worked at several locations, but reported to the same location each day to begin work, print the address of the location where he or she reported. If the person did not report to the same location each day to begin work, print the address of the location where he or she worked most last week.

If the person's employer operates in more than one location (such as a grocery store chain or public school system), print the exact address of the location or branch where the person worked. If the exact address of a school is not known, print the name of the school.

If the person worked on a college or university campus and the exact address of the workplace is not known, print the name of the building where he or she worked.

**d.** If the person worked in New York city and the county is not known, print the name of the borough where the person worked.

If the person worked in Louisiana, print the name of the parish where the person worked.

If the person worked in Alaska, print the name of the borough where the person worked.

**e.** If the person worked in a foreign country or Puerto Rico, Guam, etc., print the name of the country in 22e and leave the other parts of question 22 blank.

**23a.** If the person usually used more than one type of transportation to get to work (for example, rode the bus and transferred to the subway), fill the circle of the one method of transportation that he/she used for most of the distance during the trip.

**b.** If the person was driven to work by someone who then drove back home or to a nonwork destination, fill the circle for **Drove alone**.

DO NOT include persons who rode to school or some other nonwork destination in the count of persons who rode in the vehicle.



## Instructions for Questions 24a through 30

- 24a.** Give the time of day the person usually *left home to go to work*. DO NOT give the time that the person usually began his or her work.  
If the person usually left home to go to work sometime between 12:00 o'clock midnight and 12:00 o'clock noon, fill the **a.m.** circle.  
If the person usually left home to go to work sometime between 12:00 o'clock noon and 12:00 o'clock midnight, fill the **p.m.** circle.
- b.** Travel time is from door to door. Include time taken waiting for public transportation or picking up passengers in a carpool.
- 25.** If the person works only during certain seasons or on a day-by-day basis when work is available, mark **No**.
- 26a.** Mark **Yes** if the person tried to get a job or to start a business or professional practice at any time in the last 4 weeks; for example, registered at an employment office, went to a job interview, placed or answered ads, or did anything toward starting a business or professional practice.
- b.** Mark **No, already has a job** if the person was on layoff or was expecting to report to a job within 30 days.  
Mark **No, temporarily ill** if the person expects to be able to work within 30 days.  
Mark **No, other reasons** if the person could not have taken a job because he or she was going to school, taking care of children, etc.
- 27.** Look at the instructions for question 21a to see what to count as work. Mark **Never worked** if the person: (1) never worked at any kind of job or business, either full or part time, (2) never did any work, with or without pay, in a family business or farm, and (3) never served in the Armed Forces.
- 28a.** If the person worked for a company, business, or government agency, print the name of the company, not the name of the person's supervisor. If the person worked for an individual or a business that had no company name, print the name of the individual worked for. If the person worked in his/her own business, print "self-employed."
- b.** Print two or more words to tell what the business, industry, or individual employer named in 28a did. If there is more than one activity, describe only the major activity at the place where the person worked. Enter what is made, what is sold, or what service is given.  
Some examples of what to enter:
- |   |                       |
|---|-----------------------|
| <b>Enter a description like the following —</b> | <b>Do not enter —</b> |
| Metal furniture manufacturing                   | Furniture company     |
| Retail grocery store                            | Grocery store         |
| Petroleum refining                              | Oil company           |
| Cattle ranch                                    | Ranch                 |
- 29.** Print two or more words to describe the kind of work the person did. If the person was a trainee, apprentice, or helper, include that in the description.  
Some examples of what to enter:
- |   |                       |
|---|-----------------------|
| <b>Enter a description like the following —</b> | <b>Do not enter —</b> |
| Production clerk                                | Clerk                 |
| Carpenter's helper                              | Helper                |
| Auto engine mechanic                            | Mechanic              |
| Registered nurse                                | Nurse                 |
- 30.** Mark **Employee of a PRIVATE NOT-FOR-PROFIT . . . organization** if the person worked for a cooperative, credit union, mutual insurance company, or similar organization.  
Employees of foreign governments, the United Nations, and other international organizations should mark **PRIVATE NOT-FOR-PROFIT . . . organization**.  
For persons who worked at a public school, college or university, mark the appropriate *government* category; for example, mark **State GOVERNMENT employee** for a state university, or mark **Local GOVERNMENT employee** for a county-run community college or a city-run public school.

## Instructions for Questions 31a through 32h

- 31a.** Look at the instructions for question 21a to see what to count as work.
- b.** Count every week in which the person did any work at all, even for an hour.
- 32.** Fill the **Yes** or **No** circle for each part and enter the amount received during 1989.  
If income from any source was received jointly by household members, report, if possible, the appropriate share for each person; otherwise, report the whole amount for only one person and fill the **No** circle for the other person.
- a.** Include wages and salaries from *all jobs before deductions*. Be sure to include any tips, commissions, or bonuses. Owners of *incorporated* businesses should enter their salary here. Military personnel should include base pay plus cash housing and/or subsistence allowance, flight pay, uniform allotments, reenlistment bonuses, etc.
- b.** Include **NONFARM** profit (or loss) from self-employment in sole proprietorships and partnerships. *Exclude* profit (or loss) of incorporated businesses you own.
- c.** Include **FARM** profit (or loss) from self-employment in sole proprietorships and partnerships. *Exclude* profit (or loss) of incorporated farm businesses you own. Also *exclude* amounts from land rented for cash but include amounts from land rented for shares.
- d.** Include interest received or credited to checking and savings accounts, money market funds, certificates of deposit (CDs), IRAs, KEOGHs, and government bonds.  
Include dividends received, credited, or reinvested from ownership of stocks or mutual funds.  
Include profit (or loss) from royalties and the rental of land, buildings or real estate, or from roomers or boarders. Income received by self-employed persons whose *primary* source of income is from renting property or from royalties should be included in questions 32b or 32c above. Include regular payments from an estate or trust fund.
- e.** Include Social Security (and/or Railroad Retirement) payments to retired persons, to dependents of deceased insured workers, and to disabled workers *before* Medicare deductions.
- f.** Include Supplemental Security Income received by aged, blind, or disabled persons, Aid to Families with Dependent Children, or income from other government programs such as general or emergency assistance. Do not include assistance received from private charities. *Exclude* assistance to pay for heating (cooling) costs.
- g.** Include retirement, disability, or survivor benefits received from companies and unions; Federal, State, and local governments, and the U.S. military. Include regular income from annuities and IRA or KEOGH retirement plans.
- h.** Include Veterans' (VA) disability compensation and educational assistance payments (VEAP), unemployment compensation, child support or alimony, and all other regular payments such as Armed Forces transfer payments; assistance from private charities; regular contributions from persons not living in the household, etc.  
*Do not include the following as income in any item:*
- Refunds or rebates of any kind
  - Withdrawals from savings of any kind
  - Capital gains or losses from the sale of homes, shares of stock, etc.
  - Inheritances or insurance settlements
  - Any type of loan
  - Pay in-kind such as food, free rent, etc.

## **What the Census Is About – Some Questions and Answers**

### **Why are we taking a census?**

The most important reason for taking a decennial census is to determine how many representatives each state will have in Congress.

### **What does the Census Bureau do with the information you provide?**

The individual information collected in the census is grouped together into statistical totals. Information such as the number of persons in a given area, their ages, educational background, the characteristics of their housing, etc., enable government, business, and industry to plan more effectively.

### **How long have we been taking the census?**

The first census was taken in 1790 in accordance with the requirement in the first article of the constitution. A census has been taken every 10 years since. The 1990 Decennial Census marks the 200th anniversary of the census.

### **How are you being counted?**

Census forms are delivered to all households a few days before census day. Households are requested to fill out the form and mail it back to the census office.

## **Why the Census Asks Certain Questions**

### **Here are a few reasons for asking some of the questions.**

*It is as important to get information about people and their houses as it is to count them.*

#### **Name?**

Names help make sure that everyone in a household is counted, but that no one is counted twice.

#### **Value or rent?**

Government and planning agencies use answers to these questions in combination with other information to develop housing programs to meet the needs of people at different economic levels.

#### **Complete plumbing?**

This question gives information on the quality of housing. The data are used with other statistics to show how the "level of living" compares in various areas and how it has changed over time.

#### **Place of birth?**

This question provides information used to study long-term trends as to where people move and to study migration patterns and differences in growth patterns.

#### **Job?**

Answers to the questions about the jobs people hold provide information on the extent and types of employment in different areas of the country. From this information, training programs can be developed and the need for new industries can be determined.

#### **Income?**

Income, more than anything else, determines how families or persons live. Income information makes it possible to compare the economic levels of different areas.

# APPENDIX 14B.

## Computer Edit Sequence

Figure 1. Sequence of Computer Edit of 100-Percent Population Items

A. Persons in households:

1. Pre-edits for race—to reconcile difference between the write-in entries and FOSDIC circles for three major race categories: American Indian, Asian and Pacific Islander, and other race for which a FOSDIC circle was not available.
2. Pre-edit for age—to allocate a value to age (question 5a) when inconsistent with year of birth (question 5b).
3. Reconciled inconsistencies between each household member's relationship (question 2) to the householder (question 1), marital status (question 6), sex (question 3), and age (question 5a). Established the householder first, then checked for inconsistencies or missing data for other persons. Disallowed improbable responses such as two spouses, same-sex householder and spouse, married persons under 14 years old, and children older than their parents.

4. Allocation (if needed) of race (question 4).

5. Allocation (if needed) of Hispanic origin (question 7).

B. Persons in group quarters (GQ):

1. Pre-edit for race (question 4) and age (question 5a), similarly as in A1 and A2 above.
2. Reconciled inconsistencies in the GQ code, relationship (question 2), age (question 5a), and sex (question 3). Disallowed improbable responses such as inmates of noninstitutional GQ, females in male-only GQ's, and age violations based on the GQ age restrictions.
3. Allocation (if needed) of relationship (question 2), age (question 5a), sex (question 3), race (question 4), marital status (question 6), and Hispanic origin (question 7).

**Figure 2. Sequence of Computer Pre-Edit of Sample Population Questions**

[The purpose of the pre-edit was to make certain that every written-in entry had been coded]

| Sequence | Item number | Item description                      |
|----------|-------------|---------------------------------------|
| 1.       | 5           | Age and year of birth                 |
| 2.       | 4           | Race                                  |
| 3.       | 7           | Spanish/Hispanic origin               |
| 4.       | 9           | Citizenship                           |
| 5.       | 14          | Residence 5 years ago                 |
| 6.       | 13          | Ancestry                              |
| 7.       | 15          | Language                              |
| 8.       | 24          | Journey to work                       |
| 9.       | 22          | Place of work                         |
| 10.      | 21b         | Hours worked last week                |
| 11.      | 31c         | Usual hours worked per week           |
| 12.      | 28, 29      | Industry and occupation               |
| 13.      | 17c         | Years of active-duty military service |
| 14.      | 32          | Income by type                        |
| 15.      | 33          | Total income                          |

**Figure 3. Sequence of Computer Edit of Sample Population Questions**

| Sequence | Item number | Item description                          |
|----------|-------------|---|
| 1.       | 2           | Relationship                              |
| 2.       | 8           | Place of birth                            |
| 3.       | 9           | Citizenship                               |
| 4.       | 10          | Year of entry                             |
| 5.       | 11, 12      | Education                                 |
| 6.       | 14          | Mobility status and migration             |
| 7.       | 13          | Ancestry                                  |
| 8.       | 15          | Language                                  |
| 9.       | 18, 19      | Disability                                |
| 10.      | 20          | Fertility                                 |
| 11.      | 22          | Place of work                             |
| 12.      | 23, 24      | Journey to work                           |
| 13.      | 25, 26      | Employment status recode                  |
| 14.      | 21a         | Hours worked last week                    |
| 15.      | 27          | Year last worked                          |
| 16.      | 28-30       | Industry, occupation, and class of worker |
| 17.      | 17          | Veteran status                            |
| 18.      | 32, 33      | Income                                    |
| 19.      | H19         | Farm                                      |

**Figure 4. Sequence of Computer Edit of 100-Percent Housing Questions**

| Sequence | Item number | Item description                        |
|----------|-------------|---|
| 1.       | 4           | Tenure                                  |
| 2.       | C1          | Vacancy status                          |
| 3.       | D           | Months vacant                           |
| 4.       | C2          | Boarded up                              |
| 5.       | H2          | Units in structure                      |
| 6.       | H3          | Number of rooms                         |
| 7.       | H5a         | Acreage                                 |
| 8.       | H5b         | Commercial establishment                |
| 9.       | H6          | Value                                   |
| 10.      | H7a, b      | Monthly rent and meals included in rent |

Figure 5. Sequence of Computer Edit of Sample Housing Items

| Sequence | Item number | Item description  |
|----------|-------------|---|
| 1a.      | H4          | Tenure (occupied units)   |
| 1b.      | B           | Tenure and type of UHE (vacant UHE units)   |
| 1c.      | B           | Vacant units (regular and UHE)  |
| 2a.      | C1          | Vacancy status (vacant regular units)   |
| 2b.      | C1          | Vacancy status (vacant UHE units)   |
| 2c.      | C1          | Vacancy status (occupied units)   |
| 3a.      | D           | Months vacant (vacant units)  |
| 3b.      | D           | Months vacant (occupied units)  |
| 4a.      | C2          | Boarded up (vacant units)   |
| 4b.      | C2          | Boarded up (occupied units)   |
| 5.       | H2          | Units in structure  |
| 6.       | H3          | Rooms   |
| 7a.      | H5a         | Acreage   |
| 7b.      | H5b         | Commercial establishment  |
| 8a.      | H6          | Value (owner-occupied and vacant-for-sale-only units)   |
| 8b.      | H6          | Value (renter-occupied and vacant other than for-sale-only units)   |
| 9a.      | H7a         | Contract rent (renter-occupied and vacant-for-rent units)   |
| 9b.      | H7a         | Contract rent (owner-occupied units and vacant other than for-rent units)                                       |
| 10a.     | H7b         | Meals included in rent (renter-occupied and vacant-for-rent units)  |
| 10b.     | H7b         | Meals included in rent (owner-occupied and vacant other than for-rent units)                                    |
| 11a.     | H8          | Year householder moved into unit (occupied units)   |
| 11b.     | H8          | Year householder moved into unit (vacant units)   |
| 12a.     | H17         | Year structure built (occupied units)   |
| 12b.     | H17         | Year structure built (vacant units)   |
| 13.      | H9          | Bedrooms  |
| 14.      | H10         | Complete plumbing facilities  |
| 15.      | H11         | Complete kitchen facilities   |
| 16a.     | H12         | Telephone in unit (occupied units)  |
| 16b.     | H12         | Telephone in unit (vacant units)  |
| 17a.     | H13         | Vehicles available (occupied units)   |
| 17b.     | H13         | Vehicles available (vacant units)   |
| 18a.     | H14         | House heating fuel (occupied units)   |
| 18b.     | H14         | House heating fuel (vacant units)   |
| 19.      | H15         | Source of water   |
| 20.      | H16         | Sewage disposal   |
| 21.      | H18         | Condominium status  |
| 22a.     | H19a/H19b   | Acres and crop sales (occupied units)   |
| 22b.     | H19a/H19b   | Acres and crop sales (vacant units)   |
| 23a.     | H20a        | Electricity (all occupied units)  |
| 23b.     | H20a        | Electricity (vacant units)  |
| 24a.     | H20b        | Gas (all occupied units)  |
| 24b.     | H20b        | Gas (vacant units)  |
| 25a.     | H20c        | Water (all occupied units)  |
| 25b.     | H20c        | Water (vacant units)  |
| 26a.     | H20d        | Fuel oil (all occupied units)   |
| 26b.     | H20d        | Fuel oil (vacant units)   |
| 27a.     | H23a        | Mortgage status (owner-occupied mortgaged noncondominium one-family houses, condominium units, or mobile homes) |
| 27b.     | H23a        | Mortgage status (renter-occupied units or owner-occupied units not of above unit types)                         |
| 28a.     | H24a        | Second mortgage status (same units as edit 27a)   |
| 28b.     | H24a        | Second mortgage status (same units as edit 27b)   |
| 29a.     | H23b        | Mortgage payment (same units as edit 27a)   |
| 29b.     | H23b        | Mortgage payment (same units as edit 27b)   |
| 30a.     | 24b         | Second mortgage payment (same units as 27a)   |
| 30b.     | 24b         | Second mortgage payment (same units as 27b)   |
| 31a.     | H21         | Real estate tax (same units as 27a)   |
| 31b.     | H21         | Real estate tax (same units as 27b)   |
| 32a.     | H22         | Insurance payment (same units as 27a)   |
| 32b.     | H22         | Insurance payment (same units as 27b)   |
| 33a.     | H23c        | Real estate taxes included (same units as 27a)  |
| 33b.     | H23c        | Real estate taxes included (same units as 27b)  |
| 34a.     | H23d        | Insurance included (same units as 27a)  |
| 34b.     | H23d        | Insurance included (same units as 27b)  |
| 35a.     | H25         | Monthly condominium fee (owner-occupied condominium units)  |
| 35b.     | H25         | Monthly condominium fee (renter occupied or owner-occupied noncondominium units)                                |
| 36a.     | H26         | Mobile home fee (owner-occupied mobile homes)   |
| 36b.     | H26         | Mobile home fee (renter-occupied, owner-occupied nonmobile homes, or vacant units)                              |

## **APPENDIX 14C. Selected Code Lists**

### **Figure**

1. Enumerator's Instructions for Classifying Written-In Entries for Race
2. Enumerator's Rules for Entering Responses of Spanish/Hispanic Origin
3. Four- and Twenty-Five Group Classification of 1990 Census Languages Spoken at Home, With Illustrative Examples
4. Portion of Numerical List for Coding Ancestry
5. Alphabetical List for Coding Group Quarters Code List
6. 1990 Industrial Classification System
7. 1990 Occupational Classification System

Figure 1. Enumerator's Instructions for Classifying Written-in Entries for Race

(Question 4)

| Written-in response                       | Fill circle for— | Written-in response                             | Fill circle for— |
|---|------------------|---|------------------|
| Abenaki                                   | Indian (Amer.)   | Catalonian                                      | White            |
| African (African-American)                | Black or Negro   | Catawba   | Indian (Amer.)   |
| Afrikaner (Afrikander)                    | White            | Caucasian                                       | White            |
| Afro American                             | Black or Negro   | Cayuga  | Indian (Amer.)   |
| Aleut                                     | Aleut            | Celebesian                                      | Other API        |
| Algerian                                  | White            | Central American                                | Other race       |
| Algonquian                                | Indian (Amer.)   | Ceram   | Other API        |
| Alutiq                                    | Aleut            | Ceylonese                                       | Other API        |
| Amerasian                                 | Other API        | Chamorro  | Guamanian        |
| American Indian                           | Indian (Amer.)   | Chemehuevi                                      | Indian (Amer.)   |
| American Negro                            | Black or Negro   | Cherokee  | Indian (Amer.)   |
| Anglo-Saxon                               | White            | Cheyenne  | Indian (Amer.)   |
| Apache (Jicarilla, Mescalero, San Carlos) | Indian (Amer.)   | Chicano   | Other race       |
| Appalachian                               | White            | Chickasaw                                       | Indian (Amer.)   |
| Arab (Arabian) (Arab-American)            | White            | Chilean   | Other race       |
| Arapaho (Arapahoe)                        | Indian (Amer.)   | Chinese (Chinese-American)                      | Chinese          |
| Arikara                                   | Indian (Amer.)   | Chinook   | Indian (Amer.)   |
| Armenian                                  | White            | Chinos  | Chinese          |
| Aryan                                     | White            | Chippewa (Red Lake, Sault Ste. Marie, Sokaogan) | Indian (Amer.)   |
| Asian (Asian-American)                    | Other API        | Choctaw   | Indian (Amer.)   |
| Asian Indian                              | Asian Indian     | Chumash   | Indian (Amer.)   |
| Asiatic                                   | Other API        | Colored   | Black or Negro   |
| Assiniboine                               | Indian (Amer.)   | Colville  | Indian (Amer.)   |
| Assyrian                                  | White            | Comanche  | Indian (Amer.)   |
| Athabaskan                                | Indian (Amer.)   | Congolese                                       | Black or Negro   |
| Athapaskan                                | Indian (Amer.)   | Cosmopolitan                                    | Other race       |
| Attu Islands                              | Aleut            | Costa Rican                                     | Other race       |
| Azores                                    | White            | Coushatta                                       | Indian (Amer.)   |
| Bahamian                                  | Black or Negro   | Cree  | Indian (Amer.)   |
| Bangladeshi                               | Other API        | Creek   | Indian (Amer.)   |
| Barbadian                                 | Black or Negro   | Creole  | Other race       |
| Basque                                    | White            | Crow  | Indian (Amer.)   |
| Belgian                                   | White            | Cuban   | Other race       |
| Bengali (Bengalee)                        | Asian Indian     | Cuban Black                                     | Black or Negro   |
| Bharati                                   | Asian Indian     | Cuban White                                     | White            |
| Bhutanese (Bhoton, Bhutan)                | Other API        | Czechoslovakian                                 | White            |
| Bikini Islander                           | Other API        | Danish  | White            |
| Bifalian                                  | Black or Negro   | Delaware  | Indian (Amer.)   |
| Black (Black-American)                    | Black or Negro   | Devil's Lake (Devil's Lake Sioux)               | Indian (Amer.)   |
| Black African (Black African-American)    | Black or Negro   | Diegueno  | Indian (Amer.)   |
| Black Canadian                            | Black or Negro   | Dominican Black                                 | Black or Negro   |
| Black Cuban                               | Black or Negro   | Dominican White                                 | White            |
| Black Haitian                             | Black or Negro   | Dravidian                                       | Asian Indian     |
| Black Dominican                           | Black or Negro   | Dutch   | White            |
| Black Muslim                              | Black or Negro   | East Indian                                     | Asian Indian     |
| Black Panamanian                          | Black or Negro   | Ecuadorian                                      | Other race       |
| Black Puerto Rican                        | Black or Negro   | Egyptian  | White            |
| Black Trinidadian                         | Black or Negro   | El Salvadoran                                   | Other race       |
| Blackfeet                                 | Indian (Amer.)   | English   | White            |
| Bolivian                                  | Other race       | Eniwetok Islander (Eniwetok)                    | Other API        |
| Boricua                                   | Other race       | Eskimo  | Eskimo           |
| Borneo                                    | Other API        | Ethiopian                                       | Black or Negro   |
| Brazilian                                 | Other race       | Eurasian  | Other API        |
| British                                   | White            | European  | White            |
| Brown                                     | Other race       | Falkland Islander                               | White            |
| Bulgarian                                 | White            | Fijian  | Other API        |
| Burmese                                   | Other API        | Filipino (Filipino-American)                    | Filipino         |
| Caddo                                     | Indian (Amer.)   | Finnish   | White            |
| Cahuilla                                  | Indian (Amer.)   | Flathead  | Indian (Amer.)   |
| Cambodian                                 | Other API        | Formosan  | Other API        |
| Canadian                                  | White            | French  | White            |
| Canadian Black                            | Black or Negro   | French-Amer. Indian                             | Indian (Amer.)   |
| Canadian Indian                           | (Amer. Indian)   | French-Canadian                                 | White            |
| Canadian White                            | White            | Gabrieleno                                      | Indian (Amer.)   |
| Cantonese                                 | Chinese          | Galapagos Islander                              | Other race       |
| Cape Verdean                              | Other race       | German  | White            |
| Carolinian (Caroline Islander)            | Other API        | Ghanian   | Black or Negro   |
| Castilian                                 | White            | Goanese   | Asian Indian     |



Figure 1. Enumerator's Instructions for Classifying Written-In Entries for Race—Continued

(Question 4)

| Written-in response               | Fill circle for— | Written-in response                      | Fill circle for— |
|-----------------------------------|------------------|--|------------------|
| Great Britain.....                | White            | Makah.....                               | Indian (Amer.)   |
| Greek.....                        | White            | Malayan.....                             | Other API        |
| Grenadian.....                    | Black or Negro   | Mandan.....                              | Indian (Amer.)   |
| Gros Ventres.....                 | Indian (Amer.)   | Mariana Islander.....                    | Other API        |
| Guamanian.....                    | Guamanian        | Marshallse (Marshall Islander).....      | Other API        |
| Guatemalan.....                   | Other race       | Mashpee.....                             | Indian (Amer.)   |
| Gypsy.....                        | White            | Melanesian.....                          | Other API        |
| Haida (Haidan).....               | Indian (Amer.)   | Menominee.....                           | Indian (Amer.)   |
| Haitian.....                      | Black or Negro   | Mesquakie.....                           | Indian (Amer.)   |
| Haliwa.....                       | Indian (Amer.)   | Mestizo.....                             | Other race       |
| Havasupai.....                    | Indian (Amer.)   | Mexican.....                             | Other race       |
| Hawaiian (Hawaiian-American)..... | Hawaiian         | Mexican-American.....                    | Other race       |
| Hidatsa.....                      | Indian (Amer.)   | Mexican-Amer.-Indian.....                | Indian (Amer.)   |
| Hindu (Hindoo).....               | Asian Indian     | Mexicano.....                            | Other race       |
| Hispanic.....                     | Other race       | Miami.....                               | Indian (Amer.)   |
| Hispano.....                      | Other race       | Miccousukee.....                         | Indian (Amer.)   |
| Hmong.....                        | Other API        | Micmac.....                              | Indian (Amer.)   |
| Honduran.....                     | Other race       | Micronesian.....                         | Other API        |
| Hoopa.....                        | Indian (Amer.)   | Miwok.....                               | Indian (Amer.)   |
| Hopi.....                         | Indian (Amer.)   | Modoc.....                               | Indian (Amer.)   |
| Houma.....                        | Indian (Amer.)   | Mohawk.....                              | Indian (Amer.)   |
| Hualapai.....                     | Indian (Amer.)   | Mohican.....                             | Indian (Amer.)   |
| Hungarian.....                    | White            | Mongolian.....                           | Other API        |
| Indian-American.....              | Indian (Amer.)   | Mono.....                                | Indian (Amer.)   |
| Indian-Asian.....                 | Asian Indian     | Moroccan.....                            | White            |
| Indian-East.....                  | Asian Indian     | Moslem.....                              | White            |
| Indian-Hindu.....                 | Asian Indian     | Muckleshoot.....                         | Indian (Amer.)   |
| Indic.....                        | Asian Indian     | Mulatto.....                             | Other race       |
| Indo-Aryan.....                   | Asian Indian     | Munsee.....                              | Indian (Amer.)   |
| Indo-Asian.....                   | Asian Indian     | Muslim.....                              | Black or Negro   |
| Indo-Chinese.....                 | Other API        | Narrangansett.....                       | Indian (Amer.)   |
| Indo Dravidian.....               | Asian Indian     | Native American.....                     | Indian (Amer.)   |
| Indonesian.....                   | Other API        | Navajo (Navaho).....                     | Indian (Amer.)   |
| Inuit.....                        | Eskimo           | Negro.....                               | Black or Negro   |
| Inupiaq.....                      | Eskimo           | Nez Perce.....                           | Indian (Amer.)   |
| Inupiat.....                      | Eskimo           | Nicaraguan.....                          | Other race       |
| Iranian.....                      | White            | Nigerian.....                            | Black or Negro   |
| Irish.....                        | White            | Nigritian.....                           | Black or Negro   |
| Iroquois.....                     | Indian (Amer.)   | Nipponese.....                           | Japanese         |
| Israeli.....                      | White            | Nonwhite.....                            | Black or Negro   |
| Issue.....                        | Other race       | Nooksack.....                            | Indian (Amer.)   |
| Italian.....                      | White            | Okinawan.....                            | Other API        |
| Iwo Jima.....                     | Other API        | Omaha.....                               | Indian (Amer.)   |
| Jackson White.....                | Other race       | Oneida.....                              | Indian (Amer.)   |
| Jamaican.....                     | Black or Negro   | Onondaga.....                            | Indian (Amer.)   |
| Japanese (Japanese-American)..... | Japanese         | Oriental.....                            | Other API        |
| Javanese.....                     | Other API        | Osage.....                               | Indian (Amer.)   |
| Jewish.....                       | White            | Oto.....                                 | Indian (Amer.)   |
| Karok.....                        | Indian (Amer.)   | Ottawa.....                              | Indian (Amer.)   |
| Kashmiri (Kashmiris).....         | Asian Indian     | Pacific Islander (Pacific-American)..... | Other API        |
| Kaw.....                          | Indian (Amer.)   | Paiute.....                              | Indian (Amer.)   |
| Kickapoo.....                     | Indian (Amer.)   | Pakistani.....                           | Other API        |
| Kiowa.....                        | Indian (Amer.)   | Palestinian.....                         | White            |
| Klamath.....                      | Indian (Amer.)   | Passamoquoddy.....                       | Indian (Amer.)   |
| Kootenai.....                     | Indian (Amer.)   | Pawnee.....                              | Indian (Amer.)   |
| Korean (Korean-American).....     | Korean           | Penobscot.....                           | Indian (Amer.)   |
| Kwajalein Islander.....           | Other API        | Pequot (Eastern, Western).....           | Indian (Amer.)   |
| La Raza.....                      | Other race       | Philipino (Philippine).....              | Filipino         |
| Laotian.....                      | Other API        | Pilipino.....                            | Filipino         |
| Latin American (Latino).....      | Other race       | Pima (Piman).....                        | Indian (Amer.)   |
| Lebanese.....                     | White            | Pit River.....                           | Indian (Amer.)   |
| Liberian.....                     | Black or Negro   | Polish (Pole).....                       | White            |
| Libyan.....                       | White            | Polynesian.....                          | Other API        |
| Lithuanian.....                   | White            | Pomo.....                                | Indian (Amer.)   |
| Luiseno.....                      | Indian (Amer.)   | Ponca.....                               | Indian (Amer.)   |
| Lumbee.....                       | Indian (Amer.)   | Poospatuck.....                          | Indian (Amer.)   |
| Lummi.....                        | Indian (Amer.)   | Portuguese.....                          | White            |
| Maidu.....                        | Indian (Amer.)   |  |                  |

Figure 1. Enumerator's Instructions for Classifying Written-In Entries for Race—Continued

(Question 4)

| Written-in response   | Fill circle for— | Written-in response                        | Fill circle for— |
|---|------------------|--|------------------|
| Potawatomi (Pottawatomie, Citizens Band, Huron, Prairie Band) . . . . . | Indian (Amer.)   | Tahitian . . . . .                         | Other API        |
| Pueblo (Cochiti, Jemez, Nambe, Pojoaque, Zia) . . . . .                 | Indian (Amer.)   | Taiwanese . . . . .                        | Other API        |
| Puerto Rican . . . . .  | Other race       | Thai . . . . .                             | Other API        |
| Punjab . . . . .  | Asian Indian     | Tibetan . . . . .                          | Chinese          |
| Puyallup . . . . .  | Indian (Amer.)   | Tlingit . . . . .                          | Indian (Amer.)   |
| Quapaw . . . . .  | Indian (Amer.)   | Tokelau Islander . . . . .                 | Other API        |
| Quinault . . . . .  | Indian (Amer.)   | Tongan . . . . .                           | Other API        |
| Ramp . . . . .  | Other race       | Trinidadian . . . . .                      | Black or Negro   |
| Rasta . . . . .   | Black or Negro   | Trukese . . . . .                          | Other API        |
| Rastafarian . . . . .   | Black or Negro   | Tshimshian . . . . .                       | Indian (Amer.)   |
| Russian . . . . .   | White            | Turtle Mountain . . . . .                  | Indian (Amer.)   |
| Sac and Fox . . . . .   | Indian (Amer.)   | Turtle Mountain Chippewa . . . . .         | Indian (Amer.)   |
| Salvadoran . . . . .  | Other race       | Tuscarora . . . . .                        | Indian (Amer.)   |
| Samoa (American-Samoan) . . . . .                                       | Samoa            | Umatilla . . . . .                         | Indian (Amer.)   |
| Scandinavian . . . . .  | White            | Ute (Ute Mountain, Southern Ute) . . . . . | Indian (Amer.)   |
| Seminole . . . . .  | Indian (Amer.)   | Vietnamese . . . . .                       | Vietnamese       |
| Seneca . . . . .  | Indian (Amer.)   | Wampanoag (Mashpee, Gay Head) . . . . .    | Indian (Amer.)   |
| Shasta . . . . .  | Indian (Amer.)   | Warm Springs . . . . .                     | Indian (Amer.)   |
| Shawnee . . . . .   | Indian (Amer.)   | Wasco . . . . .                            | Indian (Amer.)   |
| Shinnecock . . . . .  | Indian (Amer.)   | Washoe . . . . .                           | Indian (Amer.)   |
| Shoshone (Shoshoni) . . . . .   | Indian (Amer.)   | Wasp (WASP) . . . . .                      | White            |
| Shumagin Islands . . . . .  | Aleut            | West Indian . . . . .                      | Black or Negro   |
| Siamese . . . . .   | Other API        | Whello . . . . .                           | Other API        |
| Sikh . . . . .  | Asian Indian     | White . . . . .                            | White            |
| Sioux (Dakota Sioux, Oglala Sioux, Rosebud Sioux) . . . . .             | Indian (Amer.)   | Winnebago . . . . .                        | Indian (Amer.)   |
| Skokomish . . . . .   | Indian (Amer.)   | Wintu . . . . .                            | Indian (Amer.)   |
| Slavic . . . . .  | White            | Wintum . . . . .                           | Indian (Amer.)   |
| South Afrikaner . . . . .   | White            | Wyandot (Wyandotte) . . . . .              | Indian (Amer.)   |
| South American . . . . .  | Other race       | Yakima . . . . .                           | Indian (Amer.)   |
| South Asian . . . . .   | Asian Indian     | Yapese . . . . .                           | Other API        |
| Spaniard . . . . .  | White            | Yaqui . . . . .                            | Indian (Amer.)   |
| Spanish . . . . .   | Other race       | Yavapai . . . . .                          | Indian (Amer.)   |
| Spanish-American . . . . .  | Other race       | Yellow . . . . .                           | Other API        |
| Spanish-Amer. Indian . . . . .  | Indian (Amer.)   | Yokuts . . . . .                           | Indian (Amer.)   |
| Spanish-Mexican . . . . .   | Other race       | Yuit . . . . .                             | Eskimo           |
| Spokane . . . . .   | Indian (Amer.)   | Yuma . . . . .                             | Indian (Amer.)   |
| Sri Lanka . . . . .   | Other API        | Yupik . . . . .                            | Eskimo           |
| Stockbridge . . . . .   | Indian (Amer.)   | Yurok . . . . .                            | Indian (Amer.)   |
| Syrian . . . . .  | White            | Zuni . . . . .                             | Indian (Amer.)   |

## Figure 2. Enumerator's Rules for Entering Responses to Spanish/Hispanic Origin

(Question 7)

1. Ask this question of *all* persons. Do *not* fill a circle according to your own observation or determine from the answer in question 4.
2. A person is of Spanish/Hispanic origin if the person's origin (ancestry) is Mexican, Mexican American, Chicano, Puerto Rican, Cuban, Spaniard, or from the Spanish-speaking countries of Central or South America or the Caribbean. If the person is of "Other Spanish/Hispanic origin," make sure to fill the circle *and* print the name of the *one* group such as Argentinean, Colombian, Costa Rican, Dominican, Spaniard, etc. Note that the term "Mexican-Am." refers only to persons of Mexican origin or ancestry.
3. If the person reports that he or she is not Spanish/Hispanic, such as German, English, Irish, Italian, etc., fill the "No (not Spanish/Hispanic)" circle.
4. If the specific origin reported does not have a circle, use the following table to decide which circle to fill ["Other Spanish/Hispanic," unless specified otherwise]:

Person Responds:

|                                      |  |
|--------------------------------------|--|
| Argentinean; Argentino(a)            | Honduran; Hondureño(a)                     |
| Balearic Islands                     | Iberian; Ibero(a)                          |
| Bolivian; Boliviano(a)               | Latin; Latino(a)                           |
| Boricua (Puerto Rican)               | La Raza (Mexican,<br>Mexican-Am., Chicano) |
| Californio                           | Majorcan                                   |
| Canary Islander/Canario(a)           | Mallorcan; Mallorquin(a)                   |
| Catalonia; Catalan(a)                | Nicaraguan; Nicaraguense                   |
| Chile; Chileno(a)                    | Panamanian; Panameno(a)                    |
| Colombian; Colombiano(a)             | Paraguay, Paraguayo(a)                     |
| Costa Rican; Costarricense           | Peruvian; Peruano(a)                       |
| Dominican Republic;<br>Dominicano(a) | Salvadoran; Salvadoreño(a)                 |
| Ecuadorian; Ecuatoriano(a)           | Spain; España                              |
| El Salvadoran; Salvador-<br>eno(a)   | Spaniard                                   |
| Espanol(a)                           | Uruguayan; Uruguayo(a)                     |
| Galapagos Islands                    | Vasco (a)                                  |
| Guatemalan; Guatemalteco(a)          | Venezuelan; Venezolano(a)                  |
| Hispano(a)                           |  |

General terms such as "Spanish," "Spanish-American," "Spanish Surnamed," "Spanish-Speaking," "Hispanic," "Latin American," "Central American," "South American," etc.

Ask if the person is Mexican, Puerto Rican, or Cuban or ask for another *specific* Spanish group. If the person provides a general response, fill the "Other Spanish/Hispanic" circle and print the group.

None of the above  
No (not Spanish/Hispanic)

5. If the person reports two or more groups and one or more group is Spanish/Hispanic, ask: "Which *one* of these groups best describes this person's origin or descent," and—
  - a. If the person gives a single group, fill the appropriate circle *and*, if required, print the group;
  - b. If the person cannot give a single group, fill the circle for the origin of the mother *and*, if required, print the group;
  - c. If the person cannot give a single group for the mother, and—
    - (1) All parts of the person's group are Spanish/Hispanic, fill the circle for the first group reported. If the Spanish origin reported is categorized in section 4 above as "Other Spanish/Hispanic," be sure to fill the "Yes, other Spanish/Hispanic" circle *and* print the groups.
    - (2) Only part of the person's origin is Spanish/Hispanic and—
      - (a) If the first group is Spanish, fill the appropriate circle. If the Spanish origin reported is categorized in section 4 above as "Other Spanish/Hispanic," be sure to fill the "Yes, other Spanish/Hispanic" circle *and* print the groups.
      - (b) If the first part is not Spanish/Hispanic, fill the "No (not Spanish/Hispanic)" circle.

**Figure 3. Four- and Twenty-Five-Group Classifications of 1990 Census Languages Spoken at Home, With Illustrative Examples**

| <b>Four-Group Classification</b>  | <b>Twenty-Five-Group Classification</b>       | <b>Examples</b>   |  |
|-----------------------------------|---|---|--|
| Spanish                           | Spanish                                       | Spanish, Ladino   |  |
| Other Indo-European               | French  | French, Cajun, French Creole  |  |
|                                   | Italian                                       |   |  |
|                                   | Portuguese                                    |   |  |
|                                   | German  |   |  |
|                                   | Yiddish                                       |   |  |
|                                   | Other West Germanic                           | Afrikaans, Dutch, Pennsylvania Dutch  |  |
|                                   | Scandinavian                                  | Danish, Norwegian, Swedish  |  |
|                                   | Polish  |   |  |
|                                   | Russian                                       |   |  |
|                                   | South Slavic                                  | Serbocroatian, Bulgarian, Macedonian, Slovene   |  |
|                                   | Other Slavic                                  | Czech, Slovak, Ukrainian  |  |
|                                   | Greek   |   |  |
|                                   | Indic   | Hindi, Bengali, Gujarathi, Punjabi, Romany, Sinhalese   |  |
| Languages of Asia and the Pacific | Other Indo-European, not elsewhere classified | Armenian, Gaelic, Lithuanian, Persian   |  |
|                                   | Chinese                                       |   |  |
|                                   | Japanese                                      |   |  |
|                                   | Mon-Khmer                                     | Cambodian   |  |
|                                   | Tagalog                                       |   |  |
|                                   | Korean  |   |  |
|                                   | Vietnamese                                    |   |  |
|                                   | Other languages (part)                        | Chamorro, Dravidian languages, Hawaiian, Ilocano, Thai, Turkish                                     |  |
|                                   | All other languages                           | Arabic  |  |
|                                   |   | Hungarian   |  |
| Native North American languages   |   |   |  |
| Other languages                   |   | Amharic, Syriac, Finnish, Hebrew, languages of Central and South America, other languages of Africa |  |

Figure 4. Portion of Numerical List for Coding Ancestry

| Code           | Entry                                | Code           | Entry                            |
|----------------|--------------------------------------|----------------|----------------------------------|
| <b>300-359</b> | <b>WEST INDIES (EXCEPT HISPANIC)</b> |                |                                  |
| 300            | BAHAMIAN                             | 325            | Barbuda                          |
| 300            | Bahamas                              | 325            | Redonda Islander                 |
| 301            | BARBADIAN                            | 326            | MONTSERRATA ISLANDER             |
| 301            | Barbados                             | 327            | KITTS-NEVIS ISLANDER             |
| 302            | BELIZEAN                             | 327            | St. Christopher Islander         |
| 302            | Belize                               | 327            | Sombrero Islander                |
| 302            | British Honduran                     | 327            | St. Kitts                        |
| 303            | BERMUDIAN                            | 327            | Nevis                            |
| 303            | Bermuda                              | 328            | DOMINICA ISLANDER                |
| 304-307        | CAYMAN ISLANDER                      | 329            | GRENADIAN                        |
| 308-309        | JAMAICAN                             | 329            | Grenada Islander                 |
| 308-309        | Jamaica                              | 330            | VINCENT-GRENADINE ISLANDER       |
| 310-313        | DUTCH WEST INDIES                    | 330            | St. Vincent Island               |
| 310            | DUTCH WEST INDIES                    | 330            | Vincentian                       |
| 310            | Black Dutch                          | 330            | Grenadines Islander              |
| 310            | Netherland Antilles                  | 331            | ST. LUCIA ISLANDER               |
| 311            | ARUBA ISLANDER                       | 332-334        | French West Indies               |
| 311            | Bonaire Islander                     | 332            | FRENCH WEST INDIES               |
| 311            | Curacao Islander                     | 332            | French West Indian               |
| 312-313        | ST. MARTIN ISLANDER                  | 333            | GUADELOUPE ISLANDER              |
| 312            | Saba Islander                        | 333            | Martinicois                      |
| 312-313        | St. Eustatius Islander               | 333            | Martinique Islander              |
| 314-316        | TRINIDADIAN TOBAGONIAN               | 334            | CAYENNE <sup>6</sup>             |
| 314            | TRINIDADIAN TOBAGONIAN               | 334            | French Guiana <sup>6</sup>       |
| 315            | TRINIDADIAN                          | 334            | French Guianese <sup>6</sup>     |
| 316            | TOBAGONIAN                           | 334            | Guyane <sup>6</sup>              |
| 317-320        | U.S. VIRGIN ISLANDER                 | 325            | WEST INDIAN                      |
| 318            | ST. CROIX ISLANDER                   | 335            | West Indies                      |
| 318            | Crucian                              | 335            | Arawak                           |
| 318            | Santa Cruz                           | 335            | Carib                            |
| 319            | ST. JOHN ISLANDER                    | 335            | Caribbean                        |
| 320            | ST. THOMAS ISLANDER                  | 335            | Garifuna                         |
| 321-331        | BRITISH WEST INDIES                  | 336-359        | HAITIAN                          |
| 321            | BRITISH VIRGIN ISLANDER              | 336-359        | Haiti                            |
| 321            | Tortolan                             |                |                                  |
| 321            | Virgin Gorda                         | <b>360-399</b> | <b>CENTRAL AND SOUTH AMERICA</b> |
| 321            | Anegada                              | 360-364        | <b>(EXCEPT HISPANIC)</b>         |
| 321            | Jost Van Dyke                        | 360-364        | BRAZILIAN                        |
| 321            | Peter and Norman                     | 365-369        | Brazil                           |
| 322            | BRITISH WEST INDIAN                  | 370-374        | SAN ANDRES                       |
| 322            | British West Indies                  | 370            | GUYANESE                         |
| 323            | TURKS AND CAICOS ISLANDER            | 370-374        | British Guiana                   |
| 324            | ANGUILLA ISLANDER                    | 375-379        | Guyana                           |
| 325            | ANTIGUA AND BARBUDA                  | 380-399        | PROVIDENCIA                      |
| 325            | Antigua                              | 380            | SURINAM                          |
|                |                                      | 380-399        | Dutch Guiana                     |
|                |                                      |                | Netherlands Guiana               |

Figure 5. Group Quarters (GQ) Code List

| Type   | GQ codes | Staff residents GQ codes |
|--|----------|--------------------------|
| <b>A. College Quarters Off Campus</b> (Coded only if occupied by 10 or more unrelated persons. If less than 10, these were classified as a housing unit.)  | 87-N     | —                        |
| <b>B. Correctional Institutions</b>  |          |                          |
| 1. <i>Federal Detention Centers</i> : Including Park Police, Bureau of Indian Affairs, Immigration and Naturalization Service (INS) centers, INS detention centers operated within local jails, and State and Federal prisons. INS detention centers also include INS Federal Alien Detention Facilities, INS Service Processing Centers, and INS Contract Detention Centers used to detain aliens under exclusion or deportation proceedings and aliens who require custodial departures. | 22-I     | 22-N                     |
| 2. <i>Federal Prisons</i> : Including criminally insane wards operated by a Federal prison within a mental or general hospital. If ward is not operated by a prison, coded according to paragraph H4. For detention centers within Federal prisons, see B1 above.  | 21-I     | 21-N                     |
| 3. <i>Halfway Houses</i> : Operated for correctional purposes, including probation and restitution centers, release centers, and community-treatment centers.  | 23-I     | 23-N                     |
| 4. <i>Local (County/City) Jails and Other Local Confinement Facilities</i> : Including work farms used to hold persons awaiting trial or serving time on relatively short sentences (usually of a year or less), and jails run by private businesses under contract.   | 27-I     | 27-N                     |
| 5. <i>Military Stockades, Jails</i>  | 95-I     | 95-N                     |
| 6. <i>Police Lockups</i> : Temporary-holding facilities or other facilities that hold persons only if they have not been formally charged in court (usually detained less than 48 hours).  | 28-I     | 28-N                     |
| 7. <i>State Prisons</i> : Prisons run by private businesses (under contract); including criminally insane wards operated by a State prison within a mental or general hospital. If ward was not operated by a prison, coded according to paragraph H4.   | 24-I     | 24-N                     |
| 8. <i>Other Types of Correctional Institutions</i> : Including private correctional facilities and correctional facilities specifically for alcohol/drug abuse. (Used only as a last resort if no other type code applied.)  | 20-I     | 20-N                     |
| <b>C. Crews of Civilian Vessels</b>  | 91-N     | —                        |
| <b>D. Dormitories</b>  |          |                          |
| 1. <i>Agriculture Workers' Dormitories on Farms</i> : Including migratory farm workers' camps on farms, bunkhouses for ranch hands, and other dormitories on farms including those on "tree farms."  | 92-N     | —                        |
| 2. <i>College Student Dormitories, and Fraternity and Sorority Houses (on campus)</i> : Including residential quarters for those in religious orders.  | 87-N     | —                        |
| 3. <i>Dormitories for Nurses and Interns in General and Military Hospitals</i>   | 86-N     | —                        |
| 4. <i>Military Quarters on Base</i> : Including barracks, bachelor officers quarters, unaccompanied officer personnel housing, unaccompanied enlisted personnel housing, and similar noninstitutional group living quarters for military personnel.  | 97-N     | —                        |

Figure 5. Group Quarters (GQ) Code List—Continued

| Type  | GQ codes     | Staff residents GQ codes |
|---|--------------|--------------------------|
| 5. <i>Other Workers' Dormitories</i> : Including logging camps, construction workers' camps, fire-house dormitories, job-training camps, energy enclave (Alaska only), Alaskan pipeline camps, nonfarm migratory workers' camps, such as workers who lay oil and gas pipelines.   | 93-N         | —                        |
| 6. <i>Runaway, Neglected, and Homeless Children</i> : Including emergency shelters/group homes which provided temporary sleeping facilities for juveniles; see paragraph F2.  | See F2 below |                          |
| <b>E. Elderly</b> : Skilled nursing facilities, intermediate care facilities, long-term care rooms in wards or buildings on the grounds of hospitals, nursing, convalescent, and rest homes including soldiers', sailors', veterans', and fraternal or religious homes for the aged, with or without nursing care.  |              |                          |
| NOTE: Excluded dormitories for nurses and interns; see paragraph D3.  |              |                          |
| 1. <i>Public ownership</i>  |              |                          |
| a. Federal ownership: Including Veterans' Administration, domiciliary homes, and U.S. Naval homes.  | 62-I         | 62-N                     |
| b. State ownership  | 63-I         | 63-N                     |
| c. County or city ownership   | 64-I         | 64-N                     |
| d. Don't know if Federal, State, or county-city ownership (Used only as a last resort if no other type code applied.)   | 65-I         | 65-N                     |
| 2. <i>Private ownership</i>   |              |                          |
| a. Private not-for-profit   | 66-I         | 66-N                     |
| b. Private for profit   | 67-I         | 67-N                     |
| c. Don't know if for profit or not (Used only as a last resort if no other type code applied.)  | 60-I         | 60-N                     |
| 3. <i>Don't know if Federal, State, local, or private ownership</i> (Used only as a last resort if no other type code applied.)   | 60-I         | 60-N                     |
| <b>F. Emergency Shelter/Street Night Enumeration ("S-NIGHT")</b>  |              |                          |
| 1. <i>Shelters for the Homeless with Sleeping Facilities</i> : Including emergency housing, missions and flophouses, Salvation Army shelters, hotels and motels charging \$12 or less a night (excluding taxes), hotels and motels used entirely for homeless persons, the group of rooms in hotels and motels used partially for the homeless, and similar places known to have persons with no usual home elsewhere who stay overnight. | 82-N         | —                        |
| 2. <i>Runaway, Neglected, and Homeless Children</i> : Including emergency shelters/group homes which provide temporary sleeping facilities for juveniles.   | 83-N         | —                        |
| 3. <i>Street Enumeration: Predesignated Sites</i>   |              |                          |
| a. Nonstructure locations, other than commerce places: Including street corners, parks, bridges, abandoned and boarded-up buildings, noncommercial campsites ("tent cities"), and similar sites.  | 84-N         | —                        |
| b. Commerce places: Including railroad stations, airports, bus depots, subway stations, all-night movie theaters, all-night restaurants, emergency hospital waiting rooms, and other similar predesignated sites.   | 85-N         |                          |
| 4. Shelters for abused women (Shelters against domestic violence)   | 75-N         | —                        |



Figure 5. Group Quarters (GQ) Code List—Continued

| Type   | GQ codes | Staff residents GQ codes |
|--|----------|--------------------------|
| <b>G. Group Homes:</b> Including those providing community-based care and supportive services such as halfway houses for the groups listed below. (Coded only if occupied by 10 or more unrelated persons. If less than 10, these were classified as a housing unit.)  |          |                          |
| 1. <i>Drug/alcohol Abuse:</i> Including group homes, detoxification centers, quarterway houses such as residential treatment facilities that work closely with an accredited hospital, halfway houses, recovery homes for ambulatory, and mentally competent recovering alcoholics who may be re-entering the work force. (Asked usual home elsewhere in those places. Included as living there only persons who had no usual home elsewhere.) | 76-N     | —                        |
| 2. <i>Maternity:</i> (Homes for unwed mothers) (Asked usual home elsewhere in these places. Included as living there only persons who had no usual home elsewhere.)  | 29-N     | —                        |
| 3. <i>Mentally Ill</i>   |          |                          |
| a. Federal   | 16-N     | —                        |
| b. State   | 17-N     | —                        |
| c. Private   | 18-N     | —                        |
| d. Don't know if public/private ownership (Used only as a last resort if no other type code applied.)  | 19-N     | —                        |
| 4. <i>Mentally Retarded</i>  |          |                          |
| a. Federal   | 56-N     | —                        |
| b. State   | 57-N     | —                        |
| c. Private   | 58-N     | —                        |
| d. Don't know if public/private ownership (Used only as a last resort if no other type code applied.)  | 59-N     | —                        |
| 5. <i>Physically Handicapped</i>   |          |                          |
| a. Public ownership  | 72-N     | —                        |
| b. Private ownership   | 73-N     | —                        |
| c. Don't know if public/private ownership (Used only as a last resort if no other type code applied.)  | 74-N     | —                        |
| 6. <i>Runaway, Neglected, and Homeless Children:</i> Including emergency shelters/group homes which provided temporary sleeping facilities for juveniles; see paragraph F2.  |          |                          |
| 7. <i>Other Group Homes:</i> Including communes, foster care homes and job corps centers with 10 or more unrelated children. Excluded emergency housing for persons with no other home. See paragraph F1. (Used only as a last resort if no other type code applied.)  | 79-N     | —                        |
| <b>H. Hospitals/Schools for the Handicapped</b>  |          |                          |
| 1. <i>Dormitories for Nurses and Interns in General and Military Hospitals</i>   | 86-N     | —                        |
| 2. <i>Drug/Alcohol Abuse:</i> Including hospitals and hospital wards in psychiatric and general hospitals. These facilities/wards were in a medical setting equipped and designed for the diagnosis and treatment of medical or psychiatric illnesses associated with alcohol or drug abuse. Patients received supervised medical/nursing care from a formally trained staff. For group homes, see paragraph G.                                | 70-I     | 70-N                     |

Figure 5. Group Quarters (GQ) Code List—Continued

| Type  | GQ codes | Staff residents GQ codes |
|---|----------|--------------------------|
| <b>3. Hospitals for Chronically Ill</b>   |          |                          |
| a. Military hospitals or wards for chronically ill  | 54-I     | 86-N                     |
| b. Other hospitals or wards for chronically ill: Including tuberculosis hospitals or wards, wards in general and Veterans' Administration hospitals for the chronically ill, neurological wards, hospices; wards for patients with Hansen's Disease (leprosy) and other incurable diseases; and other unspecified wards for the chronically ill. Excluded mental or alcohol/drug abuse hospitals or wards.  | 55-I     | 86-N                     |
| <b>4. Mentally Ill (Psychiatric): Hospitals or wards including wards for the criminally insane not operated by a prison and psychiatric wards of general hospitals and veterans' hospitals. This was a medical setting designed for the treatment of mental illness. Patients received supervised and medical/nursing care from a formally trained staff. Wards were coded for the mentally retarded according to paragraph H5. Excluded hospitals or wards for alcohol/drug abuse; see paragraph H2.</b> |          |                          |
| a. Federal ownership  | 46-I     | 46-N                     |
| b. State ownership  | 47-I     | 47-N                     |
| c. Private ownership  | 48-I     | 48-N                     |
| d. Don't know if Federal, State, local, or private ownership (Used only as a last resort if no other type code applied.)  | 45-I     | 45-N                     |
| <b>5. Mentally Retarded</b>   |          |                          |
| a. Federal ownership  | 41-I     | 41-N                     |
| b. State or local ownership   | 43-I     | 43-N                     |
| c. Private ownership  | 42-I     | 42-N                     |
| d. Don't know if Federal, State, local, or private ownership (Used only as a last resort if no other type code applied.)  | 40-I     | 40-N                     |
| <b>6. Physically Handicapped: Including schools, hospitals, or wards in a suitably equipped medical setting and designed primarily for the physically handicapped who received supervised care and medical/nursing care from a formally trained staff.</b>  |          |                          |
| <b>a. Institutions for the deaf</b>   |          |                          |
| 1) Public ownership   | 38-I     | 38-N                     |
| 2) Private ownership  | 39-I     | 39-N                     |
| 3) Don't know if public/private ownership (Used only as a last resort if no other type code applied.)   | 37-I     | 37-N                     |
| <b>b. Institutions for the blind</b>  |          |                          |
| 1) Public ownership   | 35-I     | 35-N                     |
| 2) Private ownership  | 36-I     | 36-N                     |
| 3) Don't know if public/private ownership (Used only as a last resort if no other type code applied.)   | 34-I     | 34-N                     |
| <b>c. Orthopedic wards and institutions for physically handicapped: Including accident victims, and persons with polio, cerebral palsy, and muscular dystrophy.</b>   |          |                          |
| 1) Public ownership   | 32-I     | 32-N                     |
| 2) Private ownership  | 33-I     | 22-N                     |
| 3) Don't know if public/private ownership (Used only as a last resort if no other type code applied.)   | 31-I     | 31-N                     |

Figure 5. Group Quarters (GQ) Code List—Continued

| Type  | GQ codes | Staff residents GQ codes |
|---|----------|--------------------------|
| 7. <i>Wards in General and Military Hospitals for Patients Without a Usual Home Elsewhere:</i> Including maternity, neonatal, pediatric (including wards for boarder babies), military, surgical wards, and other purpose wards of hospitals and wards for infectious diseases. | 53-I     | 86-N                     |
| NOTE: Do not include long-term care rooms for the elderly in wards or buildings on the grounds of hospitals; see paragraph E.   |          |                          |
| I. <b>Hotels/Motels:</b> S-Night locations, see paragraph F.  |          |                          |
| J. <b>Juvenile Institutions:</b> Including homes, schools, and hospitals.   |          |                          |
| 1. <i>Long-Term Care</i> (length of stay usually more than 30 days)   |          |                          |
| a. Neglected, abused, and dependent children: Including orphanages, homes, or residential care.   |          |                          |
| 1) Public ownership   | 03-I     | 03-N                     |
| 2) Private ownership  | 04-I     | 04-N                     |
| 3) Don't know if public/private ownership (Used only as a last resort if no other type code applied.)   | 02-I     | 02-N                     |
| b. Emotionally disturbed children: Including residential treatment centers (psychiatric care provided).   | 05-I     | 05-N                     |
| c. Delinquent children: Placed by court, parents, or social service agency, in residential training school or home, including industrial schools, camps, or farms.  |          |                          |
| 1) Public ownership: Committed by courts.   | 12-I     | 12-N                     |
| 2) Private ownership: Some were committed by courts, others were referred by parents or social service agencies because of delinquent behavior.   | 15-I     | 15-N                     |
| 3) Don't know if public/private ownership (Used only as a last resort if no other type code applied).   | 11-I     | 11-N                     |
| 2. <i>Short-Term</i> (length of stay usually 30 days or less)   |          |                          |
| a. Delinquent children: Including those receiving temporary care in detention or diagnostic centers pending court disposition of case.  | 10-I     | 10-N                     |
| b. Runaway, neglected, and homeless children: Including emergency shelters/group homes which provided temporary sleeping facilities for juveniles, see paragraph F5.  |          |                          |
| 3. <i>Don't Know Type of Juvenile Institution:</i> Including homes, schools, hospitals, or wards for children. (Used only as a last resort if no other type code applied.)  | 01-I     | 01-N                     |
| K. <b>Military Quarters</b>   |          |                          |
| 1. <i>On Base</i>   |          |                          |
| a. Barracks, bachelor officers quarters (BOQ), unaccompanied officer personnel housing (UOPH), unaccompanied enlisted personnel housing (UEPH), and similar noninstitutional group living quarters for military personnel   | 97-N     | —                        |
| b. Transient quarters (noninstitutional) for temporary residents (military or civilian)   | 96-N     | —                        |
| c. Dormitories for nurses and interns in general military hospitals   | 86-N     | —                        |
| d. Hospitals or wards for chronically ill   | 54-I     | 86-N                     |
| e. Stockades and jails  | 95-I     | 95-N                     |
| 2. <i>Military Ships</i>  | 98-N     | —                        |

Figure 5. Group Quarters (GQ) Code List—Continued

| Type   | GQ codes | Staff residents GQ codes |
|--|----------|--------------------------|
| <b>L. Natural Disaster:</b> Including those temporarily displaced by a natural disaster, such as "Hurricane Hugo."   | 90-N     | —                        |
| <b>M. Religious Group Quarters:</b> Including convents, monasteries, and rectories. Members of religious orders who live in a dormitory at a hospital or college were classified according to the type of place where they live, such as 86-N if at a general hospital, or 87-N if at a college. (Code only if occupied by 10 or more unrelated persons. If less than 10, these are classified as a housing unit.) | 89-N     | —                        |
| <b>N. Rooming and Boarding Houses</b> (Code only if occupied by 10 or more unrelated persons. If less than 10, these are classified as a housing unit.)  | 80-N     | —                        |
| <b>O. Schools for the Handicapped:</b> See paragraphs H5 and H6.   |          |                          |
| <b>P. Shelter/Street Night Enumeration ("S-Night"):</b> See paragraph F.   |          |                          |
| <b>Q. Other Household Living Situations:</b> Including places not covered by other GC codes shown herein, such as commercial or public campgrounds, campgrounds at racetracks, fairs, and carnivals, hostels, and similar transient sites. (Ask usual home elsewhere in these places. Include as living there only persons who have no home elsewhere.)  | 94-N     | —                        |
| <b>R. Staff of institutions:</b> Including staff personnel residing in group quarters. Coded according to the appropriate type of group quarters shown under the column "Staff residents GQ codes." Staff residents were coded with an "N" suffix.   |          |                          |

NOTE: Do not assign GQ codes to staff residents in group quarters where a "—" is shown.

**Figure 6. 1990 Industrial Classification System**

The list presents the industrial classification developed for the 1990 Census of Population and Housing. There are 235 categories for the employed, with 1 additional category for the experienced unemployed, and 7 additional categories for the Armed Forces. These categories are aggregated into 13 major groups. The classification is developed from the 1987 Standard Industrial Classification.

| 1990 industry code | Industry category  | 1990 industry code | Industry category  |
|--------------------|--|--------------------|--|
| 000-039            | AGRICULTURE, FORESTRY, AND FISHERIES                                     | 191                | Agricultural chemicals (287)   |
| 000-010            | Agricultural production, crops (01)                                      | 192-199            | Industrial and miscellaneous chemicals (281, 286, 289)   |
| 011                | Agricultural production, livestock (02)                                  | 200-209            | Petroleum and coal products  |
| 012                | Veterinary services (074)  | 200                | Petroleum refining (291)   |
| 013-020            | Landscape and horticultural services (078)                               | 201-209            | Miscellaneous petroleum and coal products (295, 299)   |
| 021-030            | Agricultural services, n.e.c. (071, 072, 075, 076)                       | 210-219            | Rubber and miscellaneous plastics products   |
| 031                | Forestry (08)  | 210                | Tires and inner tubes (301)  |
| 032-039            | Fishing, hunting, and trapping (09)                                      | 211                | Other rubber products, and plastics footwear and belting (302-306)                             |
| 040-059            | MINING   | 212-219            | Miscellaneous plastics products (308)  |
| 040                | Metal mining (10)  | 220-229            | Leather and leather products   |
| 041                | Coal mining (12)   | 220                | Leather tanning and finishing (311)  |
| 042                | Oil and gas extraction (13)  | 221                | Footwear, except rubber and plastic (313, 314)   |
| 043-059            | Nonmetallic mining and quarrying, except fuel (14)                       | 222-229            | Leather products, except footwear (315-317, 319)   |
| 060-099            | CONSTRUCTION (15, 16, 17)  | 230-399            | Durable Goods  |
| 100-399            | MANUFACTURING  | 230-241            | Lumber and wood products, except furniture   |
| 100-229            | Nondurable Goods   | 230                | Logging (241)  |
| 100-129            | Food and kindred products  | 231                | Sawmills, planing mills, and millwork (242, 243)   |
| 100                | Meat products (201)  | 232-240            | Wood buildings and mobile homes (245)  |
| 101                | Dairy products (202)   | 241                | Miscellaneous wood products (244, 249)   |
| 102-109            | Canned, frozen and preserved fruits and vegetables (203)                 | 242-249            | Furniture and fixtures (25)  |
| 110                | Grain mill products (204)  | 250-269            | Stone, clay, glass, and concrete products  |
| 111                | Bakery products (205)  | 250                | Glass and glass products (321-323)   |
| 112-119            | Sugar and confectionery products (206)                                   | 251                | Cement, concrete, gypsum, and plaster products (324, 327)                                      |
| 120                | Beverage industries (208)  | 252-260            | Structural clay products (325)   |
| 121                | Miscellaneous food preparations and kindred products (207, 209)          | 261                | Pottery and related products (326)   |
| 122-129            | Not specified food industries  | 262-269            | Miscellaneous nonmetallic mineral and stone products (328, 329)                                |
| 130-131            | Tobacco manufactures (21)  | 270-309            | Metal industries   |
| 132-150            | Textile mill products  | 270                | Blast furnaces, steelworks, rolling and finishing mills (331)                                  |
| 132-139            | Knitting mills (225)   | 271                | Iron and steel foundries (332)   |
| 140                | Dyeing and finishing textiles, except wool and knit goods (226)          | 272-279            | Primary aluminum industries (3334, part 334, 3353-3355, 3363, 3365)                            |
| 141                | Carpets and rugs (227)   | 280                | Other primary metal industries (3331, 3339, part 334, 3351, 3356, 3357, 3364, 3366, 3369, 339) |
| 142-149            | Yarn, thread, and fabric mills (221-224, 228)                            | 281                | Cutlery, handtools, and general hardware (342)   |
| 150                | Miscellaneous textile mill products (229)                                | 282-289            | Fabricated structural metal products (344)   |
| 151-159            | Apparel and other finished textile products                              | 290                | Screw machine products (345)   |
| 151                | Apparel and accessories, except knit (231-238)                           | 291                | Metal forgings and stampings (346)   |
| 152-159            | Miscellaneous fabricated textile products (239)                          | 292-299            | Ordnance (348)   |
| 160-170            | Paper and allied products  | 300                | Miscellaneous fabricated metal products (341, 343, 347, 349)                                   |
| 160                | Pulp, paper, and paperboard mills (261-263)                              | 301-309            | Not specified metal industries   |
| 161                | Miscellaneous paper and pulp products (267)                              | 310-339            | Machinery and computing equipment  |
| 162-170            | Paperboard containers and boxes (265)                                    | 310                | Engines and turbines (351)   |
| 171-179            | Printing, publishing, and allied industries                              | 311                | Farm machinery and equipment (352)   |
| 171                | Newspaper publishing and printing (271)                                  | 312-319            | Construction and material handling machines (353)  |
| 172-179            | Printing, publishing, and allied industries, except newspapers (272-279) | 320                | Metalworking machinery (354)   |
| 180-199            | Chemicals and allied products  | 321                | Office and accounting machines (3578, 3579)  |
| 180                | Plastics, synthetics, and resins (282)                                   | 322-330            | Computers and related equipment (3571-3577)  |
| 181                | Drugs (283)  | 331                | Machinery, except electrical, n.e.c. (355, 356, 358, 359)                                      |
| 182-189            | Soaps and cosmetics (284)  | 332-339            | Not specified machinery  |
| 190                | Paints, varnishes, and related products (285)                            | 340-350            | Electrical machinery, equipment, and supplies  |
|                    |  | 340                | Household appliances (363)   |
|                    |  | 341                | Radio, TV, and communication equipment (365, 366)  |

**Figure 6. 1990 Industrial Classification System —Continued**

The list presents the industrial classification developed for the 1990 Census of Population and Housing. There are 235 categories for the employed, with 1 additional category for the experienced unemployed, and 7 additional categories for the Armed Forces. These categories are aggregated into 13 major groups. The classification is developed from the 1987 Standard Industrial Classification.

| 1990 industry code | Industry category   | 1990 industry code | Industry category   |
|--------------------|---|--------------------|---|
| 342-349            | Electrical machinery, equipment, and supplies, n.e.c. (361, 362, 364, 367, 369) | 512-520            | Electrical goods (506)  |
| 350                | Not specified electrical machinery, equipment, and supplies                     | 521-529            | Hardware, plumbing and heating supplies (507)                 |
| 351-370            | Transportation equipment  | 530                | Machinery, equipment, and supplies (508)                      |
| 351                | Motor vehicles and motor vehicle equipment (371)                                | 531                | Scrap and waste materials (5093)                              |
| 352-359            | Aircraft and parts (372)  | 532-539            | Miscellaneous wholesale, durable goods (509 except 5093)      |
| 360                | Ship and boat building and repairing (373)                                      | 540-579            | Nondurable Goods  |
| 361                | Railroad locomotives and equipment (374)  | 540                | Paper and paper products (511)                                |
| 362-369            | Guided missiles, space vehicles, and parts (376)                                | 541                | Drugs, chemicals and allied products (512, 516)               |
| 370                | Cycles and miscellaneous transportation equipment (375, 379)                    | 542-549            | Apparel, fabrics, and notions (513)                           |
| 371-389            | Professional and photographic equipment, and watches                            | 550                | Groceries and related products (514)                          |
| 371                | Scientific and controlling instruments (381, 382 except 3827)                   | 551                | Farm-product raw materials (515)                              |
| 372-379            | Medical, dental, and optical instruments and supplies (3827, 384, 385)          | 552-559            | Petroleum products (517)                                      |
| 380                | Photographic equipment and supplies (386)                                       | 560                | Alcoholic beverages (518)                                     |
| 381-389            | Watches, clocks, and clockwork operated devices (387)                           | 561                | Farm supplies (5191)  |
| 390                | Toys, amusement, and sporting goods (394)                                       | 562-570            | Miscellaneous wholesale, nondurable goods (5192-5199)         |
| 391                | Miscellaneous manufacturing industries (39 except 394)                          | 571-579            | Not specified wholesale trade                                 |
| 392-399            | Not specified manufacturing industries  | 580-699            | RETAIL TRADE  |
| 400-499            | TRANSPORTATION, COMMUNICATIONS, AND OTHER PUBLIC UTILITIES                      | 580                | Lumber and building material retailing (521, 523)             |
| 400-439            | Transportation  | 581                | Hardware stores (525)   |
| 400                | Railroads (40)  | 582-589            | Retail nurseries and garden stores (526)                      |
| 401                | Bus service and urban transit (41, except 412)                                  | 590                | Mobile home dealers (527)                                     |
| 402-409            | Taxicab service (412)   | 591                | Department stores (531)                                       |
| 410                | Trucking service (421, 423)   | 592-599            | Variety stores (533)  |
| 411                | Warehousing and storage (422)   | 600                | Miscellaneous general merchandise stores (539)                |
| 412-419            | U.S. Postal Service (43)  | 601                | Grocery stores (541)  |
| 420                | Water transportation (44)   | 602-609            | Dairy products stores (545)                                   |
| 421                | Air transportation (45)   | 610                | Retail bakeries (546)   |
| 422-431            | Pipe lines, except natural gas (46)   | 611                | Food stores, n.e.c. (542, 543, 544, 549)                      |
| 432-439            | Services incidental to transportation (47)                                      | 612-619            | Motor vehicle dealers (551, 552)                              |
| 440-449            | Communications  | 620                | Auto and home supply stores (553)                             |
| 440                | Radio and television broadcasting and cable (483, 484)                          | 621                | Gasoline service stations (554)                               |
| 441                | Telephone communications (481)  | 622                | Miscellaneous vehicle dealers (555, 556, 557, 559)            |
| 442-449            | Telegraph and miscellaneous communications services (482, 489)                  | 623-629            | Apparel and accessory stores, except shoe (56, except 566)    |
| 450-499            | Utilities and sanitary services   | 630                | Shoe stores (566)   |
| 450                | Electric light and power (491)  | 631                | Furniture and home furnishings stores (571)                   |
| 451                | Gas and steam supply systems (492, 496)   | 632                | Household appliance stores (572)                              |
| 452-469            | Electric and gas, and other combinations (493)                                  | 633-639            | Radio, TV, and computer stores (5731, 5734)                   |
| 470                | Water supply and irrigation (494, 497)  | 640                | Music stores (5735, 5736)                                     |
| 471                | Sanitary services (495)   | 641                | Eating and drinking places (58)                               |
| 472-499            | Not specified utilities   | 642-649            | Drug stores (591)   |
| 500-579            | WHOLESALE TRADE   | 650                | Liquor stores (592)   |
| 500-539            | Durable Goods   | 651                | Sporting goods, bicycles, and hobby stores (5941, 5945, 5946) |
| 500                | Motor vehicles and equipment (501)  | 652-659            | Book and stationery stores (5942, 5943)                       |
| 501                | Furniture and home furnishings (502)  | 660                | Jewelry stores (5944)   |
| 502-509            | Lumber and construction materials (503)   | 661                | Gift, novelty, and souvenir shops (5947)                      |
| 510                | Professional and commercial equipment and supplies (504)                        | 662                | Sewing, needlework and piece goods stores (5949)              |
| 511                | Metals and minerals, except petroleum (505)                                     | 663-669            | Catalog and mail order houses (5961)                          |
|                    |   | 670                | Vending machine operators (5962)                              |
|                    |   | 671                | Direct selling establishments (5963)                          |
|                    |   | 672-680            | Fuel dealers (598)  |
|                    |   | 681                | Retail florists (5992)  |
|                    |   | 682-690            | Miscellaneous retail stores (593, 5948, 5993-5995, 5999)      |
|                    |   | 691-699            | Not specified retail trade                                    |
|                    |   | 700-720            | FINANCE, INSURANCE, AND REAL ESTATE                           |
|                    |   | 700                | Banking (60 except 603 and 606)                               |
|                    |   | 701                | Savings institutions, including credit unions (603, 606)      |
|                    |   | 702-709            | Credit agencies, n.e.c. (61)                                  |

**Figure 6. 1990 Industrial Classification System —Continued**

The list presents the industrial classification developed for the 1990 Census of Population and Housing. There are 235 categories for the employed, with 1 additional category for the experienced unemployed, and 7 additional categories for the Armed Forces. These categories are aggregated into 13 major groups. The classification is developed from the 1987 Standard Industrial Classification.

| 1990 industry code | Industry category   | 1990 industry code | Industry category   |
|--------------------|---|--------------------|---|
| 710                | Security, commodity brokerage, and investment companies (62, 67)    | 840                | Health services, n.e.c. (807, 808, 809)                           |
| 711                | Insurance (63, 64)  | 841                | Legal services (81)   |
| 712-720            | Real estate, including real estate-insurance offices (65)           | 842-849            | Elementary and secondary schools (821)                            |
| 721-760            | <b>BUSINESS AND REPAIR SERVICES</b>                                 | 850                | Colleges and universities (822)                                   |
| 721                | Advertising (731)   | 851                | Vocational schools (824)  |
| 722-730            | Services to dwellings and other buildings (734)                     | 852-859            | Libraries (823)   |
| 731                | Personnel supply services (736)                                     | 860                | Educational services, n.e.c. (829)                                |
| 732-739            | Computer and data processing services (737)                         | 861                | Job training and vocational rehabilitation services (833)         |
| 740                | Detective and protective services (7381, 7382)                      | 862                | Child day care services (part 835)                                |
| 741                | Business services, n.e.c. (732, 733, 735, 7383-7389)                | 863-869            | Family child care homes (part 835)                                |
| 742-749            | Automotive rental and leasing, without drivers (751)                | 870                | Residential care facilities, without nursing (836)                |
| 750                | Automotive parking and carwashes (752, 7542)                        | 871                | Social services, n.e.c. (832, 839)                                |
| 751                | Automotive repair and related services (753, 7549)                  | 872                | Museums, art galleries, and zoos (84)                             |
| 752-759            | Electrical repair shops (762, 7694)                                 | 873-879            | Labor unions (863)  |
| 760                | Miscellaneous repair services (763, 764, 7692, 7699)                | 880                | Religious organizations (866)                                     |
| 761-799            | <b>PERSONAL SERVICES</b>  | 881                | Membership organizations, n.e.c. (861, 862, 864, 865, 869)        |
| 761                | Private households (88)   | 882-889            | Engineering, architectural, and surveying services (871)          |
| 762-769            | Hotels and motels (701)   | 890                | Accounting, auditing, and bookkeeping services (872)              |
| 770                | Lodging places, except hotels and motels (702, 703, 704)            | 891                | Research, development, and testing services (873)                 |
| 771                | Laundry, cleaning, and garment services (721 except part 7219)      | 892                | Management and public relations services (874)                    |
| 772-779            | Beauty shops (723)  | 893-899            | Miscellaneous professional and related services (899)             |
| 780                | Barber shops (724)  | 900-939            | <b>PUBLIC ADMINISTRATION</b>                                      |
| 781                | Funeral service and crematories (726)                               | 900                | Executive and legislative offices (911-913)                       |
| 782-789            | Shoe repair shops (725)   | 901-909            | General government, n.e.c. (919)                                  |
| 790                | Dressmaking shops (part 7219)                                       | 910-920            | Justice, public order, and safety (92)                            |
| 791-799            | Miscellaneous personal services (722, 729)                          | 921                | Public finance, taxation, and monetary policy (93)                |
| 800-811            | <b>ENTERTAINMENT AND RECREATION SERVICES</b>                        | 922-929            | Administration of human resources programs (94)                   |
| 800                | Theaters and motion pictures (781-783, 792)                         | 930                | Administration of environmental quality and housing programs (95) |
| 801                | Video tape rental (784)   | 931                | Administration of economic programs (96)                          |
| 802-809            | Bowling centers (793)   | 932-939            | National security and international affairs (97)                  |
| 810-811            | Miscellaneous entertainment and recreation services (791, 794, 799) | 940-991            | <b>ACTIVE DUTY MILITARY</b>                                       |
| 812-899            | <b>PROFESSIONAL AND RELATED SERVICES</b>                            | 940-959            | Armed Forces  |
| 812-819            | Offices and clinics of physicians (801, 803)                        | 940                | Army  |
| 820                | Offices and clinics of dentists (802)                               | 941                | Air Force   |
| 821                | Offices and clinics of chiropractors (8041)                         | 942-949            | Navy  |
| 822-829            | Offices and clinics of optometrists (8042)                          | 950                | Marines   |
| 830                | Offices and clinics of health practitioners, n.e.c. (8043, 8049)    | 951                | Coast Guard   |
| 831                | Hospitals (806)   | 952-959            | Armed Forces, Branch not specified                                |
| 832-839            | Nursing and personal care facilities (805)                          | 960-991            | Military Reserves or National Guard                               |
|                    |   | 992-999            | <b>EXPERIENCED UNEMPLOYED NOT CLASSIFIED BY INDUSTRY</b>          |
|                    |   | 992-999            | Unemployed, last worked 1984 or earlier                           |

N.e.c. Not elsewhere classified.



**Figure 7. 1990 Occupational Classification System**

The list presents the occupational classification developed for the 1990 Census of Population and Housing. There are 500 categories for the employed with 1 additional category for the experienced unemployed and 3 additional categories for the Armed Forces. These categories are grouped into 6 summary groups and 13 major groups. The classification is developed from the 1980 Standard Occupational Classification.

| 1990 industry code | Occupational category  | 1990 industry code | Occupational category                                    |
|--------------------|--|--------------------|--|
| 000-202            | MANAGERIAL AND PROFESSIONAL SPECIALTY OCCUPATIONS                        | 066                | Actuaries (1732)   |
|                    |  | 067                | Statisticians (1733)                                     |
|                    |  | 068                | Mathematical scientists, n.e.c. (1739)                   |
| 000-042            | Executive, Administrative, and Managerial Occupations                    | 069-083            | Natural Scientists                                       |
| 000-003            | Legislators (111)  | 069-072            | Physicists and astronomers (1842, 1843)                  |
| 004                | Chief executives and general administrators, public administration (112) | 073                | Chemists, except biochemists (1845)                      |
| 005                | Administrators and officials, public administration (1132-1139)          | 074                | Atmospheric and space scientists (1846)                  |
| 006                | Administrators, protective services (1131)                               | 075                | Geologists and geodesists (1847)                         |
| 007                | Financial managers (122)   | 076                | Physical scientists, n.e.c. (1849)                       |
| 008                | Personnel and labor relations managers (123)                             | 077                | Agricultural and food scientists (1853)                  |
| 009-012            | Purchasing managers (124)  | 078                | Biological and life scientists (1854)                    |
| 013                | Managers, marketing, advertising, and public relations (125)             | 079-082            | Forestry and conservation scientists (1852)              |
| 014                | Administrators, education and related fields (128)                       | 083                | Medical scientists (1855)                                |
| 015                | Managers, medicine and health (131)                                      | 084-094            | Health Diagnosing Occupations                            |
| 016                | Postmasters and mail superintendents (1344)                              | 084                | Physicians (261)   |
| 017                | Managers, food serving and lodging establishments (1351)                 | 085                | Dentists (262)   |
| 018                | Managers, properties and real estate (1353)                              | 086                | Veterinarians (27)                                       |
| 019-020            | Funeral directors (part 1359)  | 087                | Optometrists (281)                                       |
| 021                | Managers, service organizations, n.e.c. (127, 1352, 1354, part 1359)     | 088                | Podiatrists (283)  |
| 022                | Managers and administrators, n.e.c. (121, 126, 132-1343, 136-139)        | 089-094            | Health diagnosing practitioners, n.e.c. (289)            |
|                    |  | 095-112            | Health Assessment and Treating Occupations               |
| 023-042            | Management Related Occupations   | 095                | Registered nurses (29)                                   |
| 023                | Accountants and auditors (1412)  | 096                | Pharmacists (301)  |
| 024                | Underwriters (1414)  | 097                | Dietitians (302)   |
| 025                | Other financial officers (1415, 1419)                                    | 098-105            | Therapists   |
| 026                | Management analysts (142)  | 098                | Respiratory therapists (3031)                            |
| 027                | Personnel, training, and labor relations specialists (143)               | 099-102            | Occupational therapists (3032)                           |
| 028                | Purchasing agents and buyers, farm products (1443)                       | 103                | Physical therapists (3033)                               |
| 029-032            | Buyers, wholesale and retail trade except farm products (1442)           | 104                | Speech therapists (3034)                                 |
|                    |  | 105                | Therapists, n.e.c. (3039)                                |
| 033                | Purchasing agents and buyers, n.e.c. (1449)                              | 106-112            | Physicians' assistants (304)                             |
| 034                | Business and promotion agents (145)                                      |                    |  |
| 035                | Construction inspectors (1472)   | 113-154            | Teachers, Postsecondary                                  |
| 036                | Inspectors and compliance officers, except construction (1473)           | 113                | Earth, environmental, and marine science teachers (2212) |
|                    |  | 114                | Biological science teachers (2213)                       |
| 037-042            | Management related occupations, n.e.c. (149)                             | 115                | Chemistry teachers (2214)                                |
|                    |  | 116                | Physics teachers (2215)                                  |
|                    |  | 117                | Natural science teachers, n.e.c. (2216)                  |
| 043-202            | Professional Specialty Occupations                                       | 118                | Psychology teachers (2217)                               |
|                    |  | 119-122            | Economics teachers (2218)                                |
| 043-063            | Engineers, Architects, and Surveyors                                     | 123                | History teachers (2222)                                  |
| 043                | Architects (161)   | 124                | Political science teachers (2223)                        |
| 044-062            | Engineers  | 125                | Sociology teachers (2224)                                |
| 044                | Aerospace (1622)   | 126                | Social science teachers, n.e.c. (2225)                   |
| 045                | Metallurgical and materials (1623)                                       | 127                | Engineering teachers (2226)                              |
| 046                | Mining (1624)  | 128                | Mathematical science teachers (2227)                     |
| 047                | Petroleum (1625)   | 129-132            | Computer science teachers (2228)                         |
| 048                | Chemical (1626)  | 133                | Medical science teachers (2231)                          |
| 049-052            | Nuclear (1627)   | 134                | Health specialties teachers (2232)                       |
| 053                | Civil (1628)   | 135                | Business, commerce, and marketing teachers (2233)        |
| 054                | Agricultural (1632)  | 136                | Agriculture and forestry teachers (2234)                 |
| 055                | Electrical and electronic (1633, 1636)                                   | 137                | Art, drama, and music teachers (2235)                    |
| 056                | Industrial (1634)  | 138                | Physical education teachers (2236)                       |
| 057                | Mechanical (1635)  | 139-142            | Education teachers (2237)                                |
| 058                | Marine and naval architects (1637)                                       | 143                | English teachers (2238)                                  |
| 059-062            | Engineers, n.e.c. (1639)   | 144                | Foreign language teachers (2242)                         |
| 063                | Surveyors and mapping scientists (164)                                   | 145                | Law teachers (2243)                                      |
|                    |  | 146                | Social work teachers (2244)                              |
| 064-068            | Mathematical and Computer Scientists                                     | 147                | Theology teachers (2245)                                 |
| 064                | Computer systems analysts and scientists (171)                           | 148                | Trade and industrial teachers (2246)                     |
| 065                | Operations and systems researchers and analysts (172)                    | 149-152            | Home economics teachers (2247)                           |

**Figure 7. 1990 Occupational Classification System—Continued**

The list presents the occupational classification developed for the 1990 Census of Population and Housing. There are 500 categories for the employed with 1 additional category for the experienced unemployed and 3 additional categories for the Armed Forces. These categories are grouped into 6 summary groups and 13 major groups. The classification is developed from the 1980 Standard Occupational Classification.

| 1990 industry code | Occupational category  | 1990 industry code | Occupational category   |
|--------------------|--|--------------------|---|
| 153                | Teachers, postsecondary, n.e.c. (2249)                           | 214                | Industrial engineering technicians (3712)                                     |
| 154                | Postsecondary teachers, subject not specified                    | 215                | Mechanical engineering technicians (3713)                                     |
| 155-162            | Teachers, Except Postsecondary                                   | 216                | Engineering technicians, n.e.c. (3719)  |
| 155                | Teachers, prekindergarten and kindergarten (231)                 | 217                | Drafting occupations (372)  |
| 156                | Teachers, elementary school (232)                                | 218-222            | Surveying and mapping technicians (373)                                       |
| 157                | Teachers, secondary school (233)                                 | 223-225            | Science Technicians   |
| 158                | Teachers, special education (235)                                | 223                | Biological technicians (382)  |
| 159-162            | Teachers, n.e.c. (236, 239)                                      | 224                | Chemical technicians (3831)   |
|                    |  | 225                | Science technicians, n.e.c. (3832, 3833, 384, 389)                            |
| 163                | Counselors, Educational and Vocational (24)                      | 226-242            | Technicians, Except Health, Engineering, and Science                          |
| 164-165            | Librarians, Archivists, and Curators                             | 226                | Airplane pilots and navigators (825)  |
| 164                | Librarians (251)   | 227                | Air traffic controllers (392)   |
| 165                | Archivists and curators (252)                                    | 228                | Broadcast equipment operators (393)   |
| 166-173            | Social Scientists and Urban Planners                             | 229-232            | Computer programmers (3971, 3972)   |
| 166                | Economists (1912)  | 233                | Tool programmers, numerical control (3974)                                    |
| 167                | Psychologists (1915)   | 234                | Legal assistants (396)  |
| 168                | Sociologists (1916)  | 235-242            | Technicians, n.e.c. (399)   |
| 169-172            | Social scientists, n.e.c. (1913, 1914, 1919)                     | 243-302            | Sales Occupations   |
| 173                | Urban planners (192)   | 243-252            | Supervisors and Proprietors, Sales Occupations (40)                           |
| 174-177            | Social, Recreation, and Religious Workers                        | 253-257            | Sales Representatives, Finance and Business Services                          |
| 174                | Social workers (2032)  | 253                | Insurance sales occupations (4122)  |
| 175                | Recreation workers (2033)  | 254                | Real estate sales occupations (4123)  |
| 176                | Clergy (2042)  | 255                | Securities and financial services sales occupations (4124)                    |
| 177                | Religious workers, n.e.c. (2049)                                 | 256                | Advertising and related sales occupations (4153)                              |
| 178-182            | Lawyers and Judges   | 257                | Sales occupations, other business services (4152)                             |
| 178                | Lawyers (211)  | 258-262            | Sales Representatives, Commodities, Except Retail                             |
| 179-182            | Judges (212)   | 258                | Sales engineers (421)   |
| 183-202            | Writers, Artists, Entertainers, and Athletes                     | 259-262            | Sales representatives, mining, manufacturing, and wholesale (423, 424)        |
| 183                | Authors (321)  | 263-282            | Sales Workers, Retail and Personal Services                                   |
| 184                | Technical writers (398)  | 263                | Sales workers, motor vehicles and boats (4342, 4344)                          |
| 185                | Designers (322)  | 264                | Sales workers, apparel (4346)   |
| 186                | Musicians and composers (323)                                    | 265                | Sales workers, shoes (4351)   |
| 187                | Actors and directors (324)                                       | 266                | Sales workers, furniture and home furnishings (4348)                          |
| 188                | Painters, sculptors, craft-artists, and artist printmakers (325) | 267                | Sales workers, radio, TV, hi-fi, and appliances (4343, 4352)                  |
| 189-192            | Photographers (326)  | 268                | Sales workers, hardware and building supplies (4353)                          |
| 193                | Dancers (327)  | 269-273            | Sales workers, parts (4367)   |
| 194                | Artists, performers, and related workers, n.e.c. (328, 329)      | 274                | Sales workers, other commodities (4345, 4347, 4354, 4356, 4359, 4362, 4369)   |
| 195-196            | Editors and reporters (331)                                      | 275                | Sales counter clerks (4363)   |
| 197                | Public relations specialists (332)                               | 276                | Cashiers (4364)   |
| 198                | Announcers (333)   | 277                | Street and door-to-door sales workers (4366)                                  |
| 199-202            | Athletes (34)  | 278-282            | News vendors (4365)   |
| 203-402            | TECHNICAL, SALES, AND ADMINISTRATIVE SUPPORT OCCUPATIONS         | 283-302            | Sales Related Occupations   |
| 203-242            | Technicians and Related Support Occupations                      | 283                | Demonstrators, promoters and models, sales (445)                              |
|                    |  | 284                | Auctioneers (447)   |
|                    |  | 285-302            | Sales support occupations, n.e.c. (444, 446, 449)                             |
| 203-212            | Health Technologists and Technicians                             | 303-402            | Administrative Support Occupations, including Clerical                        |
| 203                | Clinical laboratory technologists and technicians (362)          | 303-307            | Supervisors, Administrative Support Occupations                               |
| 204                | Dental hygienists (363)  | 303                | Supervisors, general office (4511, 4513, 4514, 4516, 4519, 4529)              |
| 205                | Health record technologists and technicians (364)                | 304                | Supervisors, computer equipment operators (4512)                              |
| 206                | Radiologic technicians (365)                                     | 305                | Supervisors, financial records processing (4521)                              |
| 207                | Licensed practical nurses (366)                                  | 306                | Chief communications operators (4523)   |
| 208-212            | Health technologists and technicians, n.e.c. (369)               | 307                | Supervisors, distribution, scheduling, and adjusting clerks (4522, 4524-4528) |
| 213-242            | Technologists and Technicians, Except Health                     |                    |   |
| 213-222            | Engineering and Related Technologists and Technicians            |                    |   |
| 213                | Electrical and electronic technicians (3711)                     |                    |   |

**Figure 7. 1990 Occupational Classification System—Continued**

The list presents the occupational classification developed for the 1990 Census of Population and Housing. There are 500 categories for the employed with 1 additional category for the experienced unemployed and 3 additional categories for the Armed Forces. These categories are grouped into 6 summary groups and 13 major groups. The classification is developed from the 1980 Standard Occupational Classification.

| 1990 industry code | Occupational category  | 1990 industry code | Occupational category  |
|--------------------|--|--------------------|--|
| 308-312            | Computer Equipment Operators   | 377                | Eligibility clerks, social welfare (4784)                        |
| 308                | Computer operators (4612)  | 378                | Bill and account collectors (4786)                               |
| 309-312            | Peripheral equipment operators (4613)                                  |                    |  |
| 313-315            | Secretaries, Stenographers, and Typists                                | 379-402            | Miscellaneous Administrative Support Occupations                 |
| 313                | Secretaries (4622)   | 379-382            | General office clerks (463)                                      |
| 314                | Stenographers (4623)   | 383                | Bank tellers (4791)  |
| 315                | Typists (4624)   | 384                | Proofreaders (4792)  |
|                    |  | 385                | Data-entry keyers (4793)   |
|                    |  | 386                | Statistical clerks (4794)  |
| 316-324            | Information Clerks   | 387-388            | Teachers' aides (4795)   |
| 316                | Interviewers (4642)  | 389-402            | Administrative support occupations, n.e.c. (4787, 4799)          |
| 317                | Hotel clerks (4643)  |                    |  |
| 318                | Transportation ticket and reservation agents (4644)                    | 403-472            | <b>SERVICE OCCUPATIONS</b>                                       |
| 319-322            | Receptionists (4645)   |                    |  |
| 323-324            | Information clerks, n.e.c. (4649)                                      | 403-412            | Private Household Occupations                                    |
|                    |  | 403                | Launderers and ironers (503)                                     |
| 325-336            | Records Processing Occupations, Except Financial                       | 404                | Cooks, private household (504)                                   |
| 325                | Classified-ad clerks (4662)  | 405                | Housekeepers and butlers (505)                                   |
| 326                | Correspondence clerks (4663)   | 406                | Child care workers, private household (506)                      |
| 327                | Order clerks (4664)  | 407-412            | Private household cleaners and servants (502, 507, 509)          |
| 328                | Personnel clerks, except payroll and timekeeping (4692)                |                    |  |
|                    |  | 413-432            | Protective Service Occupations                                   |
| 329-334            | Library clerks (4694)  |                    |  |
| 335                | File clerks (4696)   | 413-415            | Supervisors, Protective Service Occupations                      |
| 336                | Records clerks (4699)  | 413                | Supervisors, firefighting and fire prevention occupations (5111) |
|                    |  | 414                | Supervisors, police and detectives (5112)                        |
| 337-344            | Financial Records Processing Occupations                               | 415                | Supervisors, guards (5113)                                       |
| 337                | Bookkeepers, accounting, and auditing clerks (4712)                    |                    |  |
| 338                | Payroll and timekeeping clerks (4713)                                  | 416-417            | Firefighting and Fire Prevention Occupations                     |
| 339-342            | Billing clerks (4715)  | 416                | Fire inspection and fire prevention occupations (5122)           |
| 343                | Cost and rate clerks (4716)  | 417                | Firefighting occupations (5123)                                  |
| 344                | Billing, posting, and calculating machine operators (4718)             |                    |  |
|                    |  | 418-424            | Police and Detectives  |
| 345-347            | Duplicating, Mail and Other Office Machine Operators                   | 418-422            | Police and detectives, public service (5132)                     |
| 345                | Duplicating machine operators (4722)                                   | 423                | Sheriffs, bailiffs, and other law enforcement officers (5134)    |
| 346                | Mail preparing and paper handling machine operators (4723)             | 424                | Correctional institution officers (5133)                         |
| 347                | Office machine operators, n.e.c. (4729)                                |                    |  |
|                    |  | 425-432            | Guards   |
| 348-353            | Communications Equipment Operators                                     | 425                | Crossing guards (5142)   |
| 348-352            | Telephone operators (4732)   | 426                | Guards and police, except public service (5144)                  |
| 353                | Communications equipment operators, n.e.c. (4733, 4739)                | 427-432            | Protective service occupations, n.e.c. (5149)                    |
|                    |  |                    |  |
|                    |  | 433-472            | Service Occupations, Except Protective and Household             |
|                    |  |                    |  |
| 354-358            | Mail and Message Distributing Occupations                              | 433-444            | Food Preparation and Service Occupations                         |
| 354                | Postal clerks, except mail carriers (4742)                             | 433                | Supervisors, food preparation and service occupations (5211)     |
| 355                | Mail carriers, postal service (4743)                                   | 434                | Bartenders (5212)  |
| 356                | Mail clerks, except postal service (4744)                              | 435                | Waiters and waitresses (5213)                                    |
| 357-358            | Messengers (4745)  | 436-437            | Cooks (5214, 5215)   |
|                    |  | 438                | Food counter, fountain and related occupations (5216)            |
| 359-374            | Material Recording, Scheduling, and Distributing Clerks                | 439-442            | Kitchen workers, food preparation (5217)                         |
| 359-362            | Dispatchers (4751)   | 443                | Waiters/waitresses' assistants (5218)                            |
| 363                | Production coordinators (4752)   | 444                | Miscellaneous food preparation occupations (5219)                |
| 364                | Traffic, shipping, and receiving clerks (4753)                         |                    |  |
| 365                | Stock and inventory clerks (4754)                                      | 445-447            | Health Service Occupations                                       |
| 366                | Meter readers (4755)   | 445                | Dental assistants (5232)   |
| 368-372            | Weighers, measurers, checkers, and samplers (4756, 4757)               | 446                | Health aides, except nursing (5233)                              |
|                    |  | 447                | Nursing aides, orderlies, and attendants (5236)                  |
| 373                | Expeditors (4758)  |                    |  |
| 374                | Material recording, scheduling, and distributing clerks, n.e.c. (4759) | 448-455            | Cleaning and Building Service Occupations, Except Household      |
|                    |  | 448                | Supervisors, cleaning and building service workers (5241)        |
| 375-378            | Adjusters and Investigators  | 449-452            | Maids and housemen (5242, 5249)                                  |
| 375                | Insurance adjusters, examiners, and investigators (4782)               | 453                | Janitors and cleaners (5244)                                     |
| 376                | Investigators and adjusters, except insurance (4783)                   | 454                | Elevator operators (5245)  |
|                    |  | 455                | Pest control occupations (5246)                                  |

Figure 7. 1990 Occupational Classification System—Continued

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| 1990 industry code | Occupational category                                    | 1990 industry code | Occupational category  |
|--------------------|--|--------------------|--|
| 456-472            | Personal Service Occupations                             | 523-533            | Electrical and Electronic Equipment Repairers                                    |
| 456                | Supervisors, personal service occupations (5251)         | 523-524            | Electronic repairers, communications and industrial equipment (6151, 6153, 6155) |
| 457                | Barbers (5252)   | 525                | Data processing equipment repairers (6154)                                       |
| 458                | Hairdressers and cosmetologists (5253)                   | 526                | Household appliance and power tool repairers (6156)                              |
| 459-460            | Attendants, amusement and recreation facilities (5254)   | 527-528            | Telephone line installers and repairers (6157)                                   |
| 461                | Guides (5255)  | 529-532            | Telephone installers and repairers (6158)  |
| 462                | Ushers (5256)  | 533                | Miscellaneous electrical and electronic equipment repairers (6152, 6159)         |
| 463                | Public transportation attendants (5257)                  |                    |  |
| 464                | Baggage porters and bellhops (5262)                      | 534                | Heating, air conditioning, and refrigeration mechanics (616)                     |
| 465                | Welfare service aides (5263)                             |                    |  |
| 466                | Family child care providers (part 5264)                  | 535-552            | Miscellaneous Mechanics and Repairers  |
| 467                | Early childhood teacher's assistants (part 5264)         | 535                | Camera, watch, and musical instrument repairers (6171, 6172)                     |
| 468                | Child care workers, n.e.c. (part 5264)                   |                    |  |
| 469-472            | Personal service occupations, n.e.c. (5258, 5269)        | 536-537            | Locksmiths and safe repairers (6173)   |
|                    |  | 538                | Office machine repairers (6174)  |
| 473-476            | Farm Operators and Managers                              | 539-542            | Mechanical controls and valve repairers (6175)                                   |
| 473                | Farmers, except horticultural (5512-5514)                | 543                | Elevator installers and repairers (6176)   |
| 474                | Horticultural specialty farmers (5515)                   | 544-546            | Millwrights (6178)   |
| 475                | Managers, farms, except horticultural (5522-5524)        | 547-548            | Specified mechanics and repairers, n.e.c. (6177, 6179)                           |
| 476                | Managers, horticultural specialty farms (5525)           | 549-552            | Not specified mechanics and repairers  |
|                    |  |                    |  |
| 477-493            | Other Agricultural and Related Occupations               |                    |  |
| 477-484            | Farm Occupations, Except Managerial                      | 553-612            | Construction Trades  |
| 477-478            | Supervisors, farm workers (5611)                         |                    |  |
| 479-482            | Farm workers (5612-5617)                                 | 553-562            | Supervisors, Construction Occupations  |
| 483                | Marine life cultivation workers (5618)                   | 553                | Supervisors, brickmasons, stonemasons, and tile setters (6312)                   |
| 484                | Nursery workers (5619)                                   | 554                | Supervisors, carpenters and related workers (6313)                               |
|                    |  | 555                | Supervisors, electricians and power transmission installers (6314)               |
| 485-493            | Related Agricultural Occupations                         | 556                | Supervisors, painters, paperhangers, and plasterers (6315)                       |
| 485                | Supervisors, related agricultural occupations (5621)     | 557                | Supervisors, plumbers, pipefitters, and steamfitters (6316)                      |
| 486                | Groundskeepers and gardeners, except farm (5622)         | 558-562            | Supervisors, construction, n.e.c. (6311, 6318)                                   |
| 487                | Animal caretakers, except farm (5624)                    |                    |  |
| 488                | Graders and sorters, agricultural products (5625)        |                    |  |
| 489-493            | Inspectors, agricultural products (5627)                 |                    |  |
|                    |  |                    |  |
| 494-496            | Forestry and Logging Occupations                         | 563-612            | Construction Trades, Except Supervisors  |
| 494                | Supervisors, forestry and logging workers (571)          |                    |  |
| 495                | Forestry workers, except logging (572)                   | 563-564            | Brickmasons and stonemasons (part 6412, part 6413)                               |
| 496                | Timber cutting and logging occupations (573, 579)        | 564                | Brickmason and stonemason apprentices (part 6412, part 6413)                     |
|                    |  | 565                | Tile setters, hard and soft (part 6414, part 6462)                               |
| 497-502            | Fishers, Hunters, and Trappers                           | 566                | Carpet installers (part 6462)  |
| 497                | Captains and other officers, fishing vessels (part 8241) | 567-572            | Carpenters (part 6422)   |
| 498                | Fishers (583)  | 569-572            | Carpenter apprentices (part 6422)  |
| 499-502            | Hunters and trappers (584)                               | 573-574            | Drywall installers (6424)  |
|                    |  |                    |  |
| 503-702            | PRECISION PRODUCTION, CRAFT, AND REPAIR OCCUPATIONS      |                    |  |
|                    |  | 575-576            | Electricians (part 6432)   |
| 503-552            | Mechanics and Repairers                                  | 576                | Electrician apprentices (part 6432)  |
|                    |  | 577-578            | Electrical power installers and repairers (6433)                                 |
| 503-504            | Supervisors, mechanics and repairers (60)                | 579-582            | Painters, construction and maintenance (6442)                                    |
| 505-552            | Mechanics and Repairers, Except Supervisors              | 583                | Paperhangers (6443)  |
| 505-517            | Vehicle and Mobile Equipment Mechanics and Repairers     | 584                | Plasterers (6444)  |
|                    |  | 585-587            | Plumbers, pipefitters, and steamfitters (part 645)                               |
| 505-506            | Automobile mechanics (part 6111)                         | 587                | Plumber, pipefitter, and steamfitter apprentices (part 645)                      |
| 506                | Automobile mechanic apprentices (part 6111)              |                    |  |
| 507                | Bus, truck, and stationary engine mechanics (6112)       | 588                | Concrete and terrazzo finishers (6463)   |
| 508                | Aircraft engine mechanics (6113)                         | 589-592            | Glaziers (6464)  |
| 509-513            | Small engine repairers (6114)                            | 593                | Insulation workers (6465)  |
| 514                | Automobile body and related repairers (6115)             | 594                | Paving, surfacing, and tamping equipment operators (6466)                        |
| 515                | Aircraft mechanics, except engine (6116)                 | 595                | Roofers (6468)   |
| 516                | Heavy equipment mechanics (6117)                         | 596                | Sheetmetal duct installers (6472)  |
| 517                | Farm equipment mechanics (6118)                          | 597                | Structural metal workers (6473)  |
| 518                | Industrial machinery repairers (613)                     | 598                | Drillers, earth (6474)   |
| 519-522            | Machinery maintenance occupations (614)                  | 599-612            | Construction trades, n.e.c. (6467, 6475, 6476, 6479)                             |

Figure 7. 1990 Occupational Classification System—Continued

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|--------------------|--|--------------------|---|
| 613-627            | Extractive Occupations   | 703-902            | OPERATORS, FABRICATORS, AND LABORERS  |
| 613                | Supervisors, extractive occupations (632)                                  |                    |   |
| 614                | Drillers, oil well (652)   | 703-802            | Machine Operators, Assemblers, and Inspectors   |
| 615                | Explosives workers (653)   | 703-782            | Machine Operators and Tenders, Except Precision                                       |
| 616                | Mining machine operators (654)   | 703-716            | Metal Working and Plastic Working Machine Operators                                   |
| 617-627            | Mining occupations, n.e.c. (656)   | 703                | Lathe and turning machine set-up operators (7312)                                     |
|                    |  | 704                | Lathe and turning machine operators (7512)  |
| 628-702            | Precision Production Occupations   | 705                | Milling and planing machine operators (7313, 7513)                                    |
| 628-633            | Supervisors, production occupations (67, 71)                               | 706                | Punching and stamping press machine operators (7314, 7317, 7514, 7517)                |
| 634-655            | Precision Metal Working Occupations  |                    |   |
| 634-635            | Tool and die makers (part 6811)  | 707                | Rolling machine operators (7316, 7516)  |
| 635                | Tool and die maker apprentices (part 6811)                                 | 708                | Drilling and boring machine operators (7318, 7518)                                    |
| 636                | Precision assemblers, metal (6812)   | 709-712            | Grinding, abrading, buffing, and polishing machine operators (7322, 7324, 7522)       |
| 637-642            | Machinists (part 6813)   |                    |   |
| 639-642            | Machinist apprentices (part 6813)  | 713                | Forging machine operators (7319, 7519)  |
| 643                | Boilermakers (6814)  | 714                | Numerical control machine operators (7326)  |
| 644                | Precision grinders, filers, and tool sharpeners (6816)                     | 715-716            | Miscellaneous metal, plastic, stone, and glass working machine operators (7329, 7529) |
| 645                | Patternmakers and model makers, metal (6817)                               |                    |   |
| 646                | Lay-out workers (6821)   |                    |   |
| 647-648            | Precious stones and metals workers (Jewelers) (6822, 6866)                 | 717-718            | Fabricating machine operators, n.e.c. (7339, 7539)                                    |
| 649-652            | Engravers, metal (6823)  |                    |   |
| 653-654            | Sheet metal workers (part 6824)  | 719-725            | Metal and Plastic Processing Machine Operators  |
| 654                | Sheet metal worker apprentices (part 6824)                                 | 719-722            | Molding and casting machine operators (7315, 7342, 7515, 7542)                        |
| 655                | Miscellaneous precision metal workers (6829)                               |                    |   |
|                    |  | 723                | Metal plating machine operators (7343, 7543)  |
| 656-665            | Precision Woodworking Occupations  | 724                | Heat treating equipment operators (7344, 7544)  |
| 656                | Patternmakers and model makers, wood (6831)                                | 725                | Miscellaneous metal and plastic processing machine operators (7349, 7549)             |
| 657                | Cabinet makers and bench carpenters (6832)                                 |                    |   |
| 658                | Furniture and wood finishers (6835)  | 726-733            | Woodworking Machine Operators   |
| 659-665            | Miscellaneous precision woodworkers (6839)                                 | 726                | Wood lathe, routing, and planing machine operators (7431, 7432, 7631, 7632)           |
| 666-674            | Precision Textile, Apparel, and Furnishings Machine Workers                | 727                | Sawing machine operators (7433, 7633)   |
| 666                | Dressmakers (part 6852, part 7752)   | 728                | Shaping and joining machine operators (7435, 7635)                                    |
| 667                | Tailors (part 6852)  | 729-732            | Nailing and tacking machine operators (7636)  |
| 668                | Upholsterers (6853)  | 733                | Miscellaneous woodworking machine operators (7434, 7439, 7634, 7639)                  |
| 669-673            | Shoe repairers (6854)  |                    |   |
| 674                | Miscellaneous precision apparel and fabric workers (6856, 6859, part 7752) | 734-737            | Printing Machine Operators  |
|                    |  | 734                | Printing press operators (7443, 7643)   |
| 675-685            | Precision Workers, Assorted Materials                                      | 735                | Photoengravers and lithographers (6842, 7444, 7644)                                   |
| 675                | Hand molders and shapers, except jewelers (6861)                           | 736                | Typesetters and compositors (6841, 7642)  |
| 676                | Patternmakers, lay-out workers, and cutters (6862)                         | 737                | Miscellaneous printing machine operators (6849, 7449, 7649)                           |
| 677                | Optical goods workers (6864, part 7477, part 7677)                         |                    |   |
| 678                | Dental laboratory and medical appliance technicians (6865)                 | 738-752            | Textile, Apparel, and Furnishings Machine Operators                                   |
| 679-682            | Bookbinders (6844)   | 738                | Winding and twisting machine operators (7451, 7651)                                   |
| 683                | Electrical and electronic equipment assemblers (6867)                      | 739-742            | Knitting, looping, taping, and weaving machine operators (7452, 7652)                 |
| 684-685            | Miscellaneous precision workers, n.e.c. (6869)                             |                    |   |
|                    |  | 743                | Textile cutting machine operators (7654)  |
| 686-688            | Precision Food Production Occupations                                      | 744                | Textile sewing machine operators (7655)   |
| 686                | Butchers and meat cutters (6871)   | 745-746            | Shoe machine operators (7656)   |
| 687                | Bakers (6872)  | 747                | Pressing machine operators (7657)   |
| 688                | Food batchmakers (6873, 6879)  | 748                | Laundering and dry cleaning machine operators (6855, 7658)                            |
| 689-693            | Precision Inspectors, Testers, and Related Workers                         | 749-752            | Miscellaneous textile machine operators (7459, 7659)                                  |
| 689-692            | Inspectors, testers, and graders (6881, 828)                               |                    |   |
| 693                | Adjusters and calibrators (6882)   | 753-782            | Machine Operators, Assorted Materials   |
|                    |  | 753                | Cementing and gluing machine operators (7661)   |
| 694-702            | Plant and System Operators   | 754                | Packaging and filling machine operators (7462, 7662)                                  |
| 694                | Water and sewage treatment plant operators (691)                           | 755                | Extruding and forming machine operators (7463, 7663)                                  |
| 695                | Power plant operators (part 693)   | 756                | Mixing and blending machine operators (7664)  |
| 696-698            | Stationary engineers (part 693, 7668)                                      | 757                | Separating, filtering, and clarifying machine operators (7476, 7666, 7676)            |
| 699-702            | Miscellaneous plant and system operators (692, 694, 695, 696)              | 758                | Compressing and compacting machine operators (7467, 7667)                             |

Figure 7. 1990 Occupational Classification System—Continued

The list presents the occupational classification developed for the 1990 Census of Population and Housing. There are 500 categories for the employed with 1 additional category for the experienced unemployed and 3 additional categories for the Armed Forces. These categories are grouped into 6 summary groups and 13 major groups. The classification is developed from the 1980 Standard Occupational Classification.

| 1990 industry code | Occupational category   | 1990 industry code | Occupational category   |
|--------------------|---|--------------------|---|
| 759-762            | Painting and paint spraying machine operators (7669)            | 833                | Marine engineers (8244)   |
| 763                | Roasting and baking machine operators, food (7472, 7672)        | 834-842            | Bridge, lock, and lighthouse tenders (8245)   |
| 764                | Washing, cleaning, and pickling machine operators (7673)        |                    |   |
| 765                | Folding machine operators (7474, 7674)                          | 843-863            | Material Moving Equipment Operators   |
| 766-767            | Furnace, kiln, and oven operators, except food (7675)           | 843                | Supervisors, material moving equipment operators (812)  |
| 768                | Crushing and grinding machine operators (part 7477, part 7677)  | 844                | Operating engineers (8312)  |
| 769-772            | Slicing and cutting machine operators (7478, 7678)              | 845-847            | Longshore equipment operators (8313)  |
| 773                | Motion picture projectionists (part 7479)                       | 848                | Hoist and winch operators (8314)  |
| 774-776            | Photographic process machine operators (6863, 6868, 7671)       | 849-852            | Crane and tower operators (8315)  |
| 777-778            | Miscellaneous machine operators, n.e.c. (part 7479, 7665, 7679) | 853-854            | Excavating and loading machine operators (8316)   |
| 779-782            | Machine operators, not specified                                | 855                | Grader, dozer, and scraper operators (8317)   |
| 783-795            | Fabricators, Assemblers, and Hand Working Occupations           | 856-858            | Industrial truck and tractor equipment operators (8318)   |
| 783                | Welders and cutters (7332, 7532, 7714)                          | 859-863            | Miscellaneous material moving equipment operators (8319)  |
| 784                | Solderers and brazers (7333, 7533, 7717)                        | 864-902            | Handlers, Equipment Cleaners, Helpers, and Laborers   |
| 785                | Assemblers (772, 774)   | 864                | Supervisors, handlers, equipment cleaners, and laborers, n.e.c. (85)  |
| 786                | Hand cutting and trimming occupations (7753)                    | 865                | Helpers, mechanics, and repairers (863)   |
| 787-788            | Hand molding, casting, and forming occupations (7754, 7755)     | 866-868            | Helpers, construction, and Extractive Occupations   |
| 789-792            | Hand painting, coating, and decorating occupations (7756)       | 866                | Helpers, construction trades (8641-8645, 8648)  |
| 793-794            | Hand engraving and printing occupations (7757)                  | 867                | Helpers, surveyor (8646)  |
| 795                | Miscellaneous hand working occupations (7758, 7759)             | 868                | Helpers, extractive occupations (865)   |
| 796-802            | Production Inspectors, Testers, Samplers, and Weighers          | 869-873            | Construction laborers (871)   |
| 796                | Production inspectors, checkers, and examiners (782, 787)       | 874                | Production helpers (861, 862)   |
| 797                | Production testers (783)  | 875-884            | Freight, Stock, and Material Handlers   |
| 798                | Production samplers and weighers (784)                          | 875                | Garbage collectors (8722)   |
| 799-802            | Graders and sorters, except agricultural (785)                  | 876                | Stevedores (8723)   |
|                    |   | 877                | Stock handlers and baggers (8724)   |
|                    |   | 878-882            | Machine feeders and offbearers (8725)   |
| 803-863            | Transportation and Material Moving Occupations                  | 883-884            | Freight, stock, and material handlers, n.e.c. (8726)  |
| 803-822            | Motor Vehicle Operators   | 885-886            | Garage and service station related occupations (873)  |
| 803                | Supervisors, motor vehicle operators (8111)                     | 887                | Vehicle washers and equipment cleaners (875)  |
| 804-805            | Truck drivers (8212-8214)                                       | 888                | Hand packers and packagers (8761)   |
| 806-807            | Driver-sales workers (8218)                                     | 889-902            | Laborers, except construction (8769)  |
| 808                | Bus drivers (8215)  |                    |   |
| 809-812            | Taxicab drivers and chauffeurs (8216)                           | 903-908            | MILITARY OCCUPATIONS (Includes only uniquely military occupations. Other Armed Forces members are coded to civilian occupations.) |
| 813                | Parking lot attendants (874)                                    |                    |   |
| 814-822            | Motor transportation occupations, n.e.c. (8219)                 |                    |   |
|                    |   | 903                | Commissioned officers and warrant officers  |
| 823-842            | Transportation Occupations, Except Motor Vehicles               | 904                | Non-commissioned officers and other enlisted personnel  |
| 823-827            | Rail Transportation Occupations                                 |                    |   |
| 823                | Railroad conductors and yardmasters (8113)                      | 905-908            | Military occupation, rank not specified   |
| 824                | Locomotive operating occupations (8232)                         |                    |   |
| 825                | Railroad brake, signal, and switch operators (8233)             | 909-999            | EXPERIENCED UNEMPLOYED NOT CLASSIFIED BY OCCUPATION   |
| 826-827            | Rail vehicle operators, n.e.c. (8239)                           |                    |   |
| 828-842            | Water Transportation Occupations                                | 909-999            | Unemployed, last worked 1984 or earlier   |
| 828                | Ship captains and mates, except fishing boats (part 8241, 8242) |                    |   |
| 829-832            | Sailors and deckhands (8243)                                    |                    |   |

N.e.c. Not elsewhere classified.

# APPENDIX A.

## 1990 Decennial Census Appropriations, Obligations, and Costs, by Fiscal Year

**Table 1. 1990 Decennial Census Appropriations and Obligations, by Fiscal Year**

| Fiscal year     | Actual 1990 Census<br>(millions of dollars) |              |
|-----------------|---|--------------|
|                 | Appropriation                               | Obligation** |
| FY 1984 .....   | 14.0  | 13.5         |
| FY 1985 .....   | 27.9  | 27.9         |
| FY 1986 .....   | 49.0  | 46.5         |
| FY 1987 .....   | 79.6  | 71.7         |
| FY 1988 .....   | 221.6                                       | 190.4        |
| FY 1989 .....   | 416.1                                       | 365.0        |
| FY 1990 .....   | 1,358.8                                     | 1,382.1      |
| FY 1991 .....   | 202.0                                       | 246.1        |
| FY 1992 .....   | 72.6  | 82.2         |
| FY 1993 .....   | 52.0  | 57.9         |
| FY 1994 * ..... | -   | 9.5          |
| FY 1995 * ..... | -   | 0.6          |
| Total .....     | 2,493.6                                     | 2,493.4      |

- Represents zero. \* Funds made available from prior year deobligations enabled the Census Bureau to continue work on the 1990 census in FY 1994 and FY 1995. \*\*This table does not include certain data-processing obligations totalling \$84,783,000. These obligations, although related to the 1990 Decennial Census, were charged to the Bureau's data-processing allocation, not to decennial census funding.



**Table 2. 1990 Decennial Census Total Costs and Obligations, by Fiscal Year**

| Line item/framework                            | FY84          | FY85          | FY86          | FY87          | FY88           | FY89           | FY90             | FY91           | FY92          | FY93          | FY94*        | FY95*      | Total            |
|--|---------------|---------------|---------------|---------------|----------------|----------------|------------------|----------------|---------------|---------------|--------------|------------|------------------|
| <b>Accruals:</b>                               |               |               |               |               |                |                |                  |                |               |               |              |            |                  |
| Planning, direction, and review .....          | \$ 3,578      | \$ 4,975      | \$ 6,965      | \$ 7,833      | \$ 10,131      | \$ 12,539      | \$ 13,630        | \$ 13,927      | \$ 10,078     | \$ 8,334      | \$ 8,715     | \$ 1       | \$ 100,706       |
| Test censuses and dress rehearsal .....        | 2,625         | 11,676        | 16,086        | 14,721        | 18,890         | 1,982          | 750              | 82             | 3             | (6)           | (1)          | -          | 66,808           |
| Data collection .....                          | 524           | 503           | 912           | 4,847         | 26,718         | 79,030         | 1,104,700        | 55,443         | 15,573        | 713           | 6            | -          | 1,288,969        |
| Operations .....                               | 747           | 3,269         | 8,315         | 17,752        | 77,128         | 197,881        | 200,315          | 122,346        | 26,409        | 9,111         | 314          | 235        | 663,822          |
| Geography .....                                | 428           | 473           | 4,212         | 11,772        | 25,119         | 31,002         | 27,704           | 21,808         | 8,782         | 4,464         | 1            | 2          | 135,767          |
| Address list development .....                 | 134           | 147           | 353           | 1,274         | 40,017         | 118,777        | 16,491           | 2,309          | (135)         | (1)           | (2)          | -          | 179,364          |
| 1990 data processing ** .....                  | 4             | 2,349         | 3,499         | 3,459         | 10,876         | 45,975         | 127,513          | 91,658         | 14,279        | 3,115         | 6            | (1)        | 302,732          |
| Puerto Rico & outlying areas .....             | -             | 72            | 251           | 832           | 1,116          | 2,127          | 28,406           | 6,564          | 3,455         | 1,465         | (1)          | -          | 44,287           |
| Follow-on surveys .....                        | 181           | 228           | -             | 415           | -              | -              | 201              | (1)            | -             | -             | -            | -          | 1,024            |
| Micronesia .....                               | -             | -             | -             | -             | -              | -              | -                | 8              | 28            | 68            | 310          | 234        | 648              |
| Product development and data dissemination ..  | 1,127         | 2,998         | 3,714         | 4,551         | 5,676          | 17,262         | 47,786           | 20,281         | 26,823        | 22,543        | 72           | (1)        | 152,832          |
| Content requirements .....                     | 1,092         | 2,592         | 3,294         | 1,453         | 1,743          | 9,586          | 36,271           | 2,199          | (983)         | -             | (3)          | -          | 57,244           |
| Data tabulation & publication .....            | 35            | 406           | 420           | 3,098         | 3,933          | 7,676          | 11,515           | 18,082         | 27,806        | 22,543        | 75           | (1)        | 95,588           |
| Promotion and outreach .....                   | 313           | 744           | 1,499         | 3,809         | 7,932          | 22,480         | 27,545           | 8,362          | 25            | (5)           | (6)          | 2          | 72,700           |
| Statistical research and evaluation .....      | 528           | 2,486         | 3,423         | 4,673         | 5,550          | 8,554          | 29,700           | 36,551         | 13,213        | 5,247         | (2)          | 1          | 110,324          |
| Sample redesign .....                          | 5,314         | 3             | 2,374         | -             | -              | -              | -                | -              | -             | -             | -            | -          | 7,691            |
| 21st century planning staff .....              | -             | -             | -             | -             | 313            | 689            | 836              | 56             | 1             | -             | -            | -          | 1,895            |
| Residential finance survey .....               | -             | -             | -             | -             | -              | 220            | 370              | 3,682          | 1,409         | 717           | -            | -          | 6,398            |
| Errors in expense statements .....             | 271           | 871           | 381           | 3             | -              | 13             | 90               | 31             | 3             | -             | (108)        | 3          | 1,558            |
|  | 15,027        | 27,525        | 43,669        | 58,189        | 152,738        | 340,650        | 1,425,722        | 260,761        | 93,537        | 46,854        | 8,990        | 241        | 2,473,703        |
| Undelivered orders .....                       | 3,475         | 3,284         | 6,411         | 20,209        | 62,924         | 99,011         | 54,915           | 43,375         | 26,114        | 7,799         | 11           | 1          | 327,529          |
| Prior year undelivered orders .....            | -             | (3,475)       | (3,455)       | (6,368)       | (20,209)       | (62,928)       | (99,011)         | (54,912)       | (43,374)      | (NA)          | (NA)         | (NA)       | (293,732)        |
| Prior year upward adjustments .....            | -             | -             | -             | -             | -              | -              | -                | -              | -             | 2,377         | 276          | 359        | 3,012            |
| Other distributions (GPE, etc.) .....          | 309           | 505           | 123           | -             | -              | 10             | (2)              | 3              | -             | -             | -            | -          | 948              |
| Subtotal .....                                 | 18,811        | 27,839        | 46,748        | 72,030        | 195,453        | 376,743        | 1,381,624        | 249,227        | 76,277        | 56,830        | 9,277        | 601        | 2,511,460        |
| Corrections .....                              | 14            | -             | -             | 1             | -              | -              | -                | (69)           | 2             | (1)           | -            | -          | (53)             |
| Prior year recoveries .....                    | 534           | 252           | 211           | 255           | 1,691          | 3,348          | 7,098            | 3,585          | 6,677         | (NA)          | (NA)         | (NA)       | 23,651           |
| Interfund adjustments .....                    | 13            | 183           | 103           | 1,400         | 583            | 1,738          | (927)            | 411            | 105           | 1,815         | 331          | 7          | 5,762            |
| Unfunded adjustments .....                     | (261)         | (185)         | (267)         | (314)         | (547)          | (588)          | (959)            | (938)          | (772)         | (748)         | (116)        | (3)        | (5,698)          |
| <b>CURRENT YEAR OBLIGATIONS .....</b>          | <b>19,111</b> | <b>28,089</b> | <b>46,795</b> | <b>73,372</b> | <b>197,180</b> | <b>381,241</b> | <b>1,386,836</b> | <b>252,216</b> | <b>82,289</b> | <b>57,896</b> | <b>9,492</b> | <b>605</b> | <b>2,535,122</b> |
| Adjustments & sample redesign .....            | (5,314)       | -             | -             | -             | -              | -              | -                | -              | -             | -             | -            | -          | (5,314)          |
| Adjustment for PY recoveries .....             | 13,797        | 28,089        | 46,795        | 73,372        | 197,180        | 381,241        | 1,386,836        | 252,216        | 82,289        | 57,896        | 9,492        | 605        | 2,529,808        |
|  | (252)         | (211)         | (255)         | (1,691)       | (6,743)        | (16,314)       | (4,694)          | (6,111)        | (102)         | -             | -            | -          | (36,373)         |
| <b>1990 DECENNIAL CENSUS OBLIGATIONS .....</b> | <b>13,545</b> | <b>27,878</b> | <b>46,540</b> | <b>71,681</b> | <b>190,437</b> | <b>364,927</b> | <b>1,382,142</b> | <b>246,105</b> | <b>82,187</b> | <b>57,896</b> | <b>9,492</b> | <b>605</b> | <b>2,493,435</b> |

- Represents zero. \*Funds made available from prior year deobligations enabled the Census Bureau to continue work on the 1990 Decennial Census in FY 1994 and FY 1995. \*\*This table does not include certain data-processing obligations totalling \$84,783,000. These obligations, although relating to the 1990 Decennial Census, were charged to the Bureau's data-processing allocation, not to decennial census funding. NA Not available.

# APPENDIX 1A.

## Provisions of Title 13, United States Code, Relating to the 1990 Census

### TITLE 13, UNITED STATES CODE—CENSUS

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### CHAPTER 1.—ADMINISTRATION

#### SUBCHAPTER I—GENERAL PROVISIONS

Sec.

1. Definitions.
2. Bureau of the Census.
3. Seal.
4. Functions.
5. Questionnaires; number, form, and scope of inquiries.
6. Information from other Federal departments and agencies; acquisition of reports from other governmental and private sources.
7. Printing; requisitions upon Public Printer; publication of bulletins and reports.
8. Authenticated transcripts or copies of certain returns; other data; restriction on use; disposition of fees received.
9. Information as confidential; exception.
11. Authorization of appropriations.
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#### SUBCHAPTER II—OFFICERS AND EMPLOYEES

21. Director of the Census; duties.
22. Qualifications of permanent personnel.
23. Additional officers and employees.
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## SUBCHAPTER I—GENERAL PROVISIONS

### § 1. Definitions

As used in this title, unless the context requires another meaning or unless it is otherwise provided—

- (1) “Bureau” means the Bureau of the Census;
- (2) “Secretary” means the Secretary of Commerce; and
- (3) “respondent” includes a corporation, company, association, firm, partnership, proprietorship, society, joint stock company, individual, or other organization or entity which reported information, or on behalf of which information was reported, in response to a questionnaire, inquiry, or other request of the Bureau. (Aug. 31, 1954, c. 1158, 68 Stat. 1012; Oct. 17, 1976, Pub. L. 94-521, § 1, 90 Stat. 2459.)

### § 2. Bureau of the Census

The Bureau is continued as an agency within, and under the jurisdiction of, the Department of Commerce. (Aug. 31, 1954, c. 1158, 68 Stat. 1012.)

### § 3. Seal

The Bureau shall have a seal containing such device as has been selected heretofore, or as the Secretary may select hereafter. A description of such seal with an impression thereof shall be filed in the office of the Secretary of State. The seal shall remain in the custody of the Secretary or such officer or employee of the Bureau as he designates, and shall be affixed to all documents authenticated by the Bureau. Judicial notice shall be taken of the seal. (Aug. 31, 1954, c. 1158, 68 Stat. 1012; Aug. 28, 1957, Pub. L. 85-207, § 2, 71 Stat. 481; Oct. 17, 1976, Pub. L. 94-521, § 2, 90 Stat. 2459.)

### § 4. Functions of Secretary; regulations; delegation

The Secretary shall perform the functions and duties imposed upon him by this title, may issue such rules and regulations as he deems necessary to carry out such functions and duties, and may delegate the performance of such functions and duties and the authority to issue such rules and regulations to such officers and employees of the Department of Commerce as he may designate. (Aug. 31, 1954, c. 1158, 68 Stat. 1013; Oct. 17, 1976, Pub. L. 94-521, § 3(a), 90 Stat. 2459.)

### § 5. Questionnaires; number, form, and scope of inquiries

The Secretary shall prepare questionnaires, and shall determine the inquiries, and the number, form, and subdivisions thereof, for the statistics, surveys, and censuses provided for in this title. (Aug. 31, 1954, c. 1158, 68 Stat. 1013; Oct. 17, 1976, Pub. L. 94-521, § 4(a), 90 Stat. 2459.)

### § 6. Information from other Federal departments and agencies; acquisition of reports from other governmental and private sources

(a) The Secretary, whenever he considers it advisable, may call upon any other department, agency, or establishment of the Federal Government, or of the government of the District of Columbia, for information pertinent to the work provided for in this title.

(b) The Secretary may acquire, by purchase or otherwise, from States, counties, cities, or other units of government, or their instrumentalities, or from private persons and agencies, such copies of records, reports, and other material as may be required for the efficient and economical conduct of the censuses and surveys provided for in this title.

(c) To the maximum extent possible and consistent with the kind, timeliness, quality and scope of the statistics required, the Secretary shall acquire and use information available from any source referred to in subsection (a) or (b) of this section instead of conducting direct inquiries. (Aug. 31, 1954, c. 1158, 68 Stat. 1013; Aug. 28, 1957, Pub. L. 85-207, § 3, 71 Stat. 481; Oct. 17, 1976, Pub. L. 94-521, § 5(a), 90 Stat. 2460.)

### § 7. Printing; requisitions upon Public Printer; publication of bulletins and reports

The Secretary may make requisition upon the Public Printer for miscellaneous printing necessary to carry out the provisions of this title. He may further have printed by the Public Printer, in such editions as he deems necessary, preliminary and other census bulletins, and final reports of the results of the several investigations authorized by this title, and may publish and distribute such bulletins and reports. (Aug. 31, 1954, c. 1158, 68 Stat. 1013.)

**§ 8. Authenticated transcripts or copies of certain returns; other data; restriction on use; disposition of fees received**

(a) The Secretary may, upon written request, furnish to any respondent, or to the heir, successor, or authorized agent of such respondent, authenticated transcripts or copies of reports (or portions thereof) containing information furnished by, or on behalf of, such respondent in connection with the surveys and census provided for in this title, upon payment of the actual or estimated cost of searching the records and furnishing such transcripts or copies.

(b) Subject to the limitations contained in sections 6(c) and 9 of this title, the Secretary may furnish copies of tabulations and other statistical materials which do not disclose the information reported by, or on behalf of, any particular respondent, and may make special statistical compilations and surveys, for departments, agencies, and establishments of the Federal Government, the government of the District of Columbia, the government of any possession or area (including political subdivisions thereof) referred to in section 191(a) of this title, State or local agencies, or other public and private persons and agencies, upon payment of the actual or estimated cost of such work. In the case of nonprofit agencies or organizations, the Secretary may engage in joint statistical projects, the purpose of which are otherwise authorized by law, but only if the cost of such projects are shared equitably, as determined by the Secretary.

(c) In no case shall information furnished under this section be used to the detriment of any respondent or other person to whom such information relates, except in the prosecution of alleged violations of this title.

(d) All moneys received in payment for work or services enumerated under this section shall be deposited in a separate account which may be used to pay directly the costs of such work or services, to repay appropriations which initially bore all or part of such costs, or to refund excess sums when necessary. (Aug. 31, 1954, c. 1158, 68 Stat. 1013; Aug. 28, 1957, Pub. L. 85-207, § 4, 71 Stat. 481; Oct. 17, 1976, Pub. L. 94-521, § 6(a), 90 Stat. 2460.)

**§ 9. Information as confidential; exception**

(a) Neither the Secretary, nor any other officer or employee of the Department of Commerce or bureau or agency thereof or local government census liaison, may, except as provided in section 8 or 16 or chapter 10 of this title—

(1) use the information furnished under the provisions of this title for any purpose other than the statistical purposes for which it is supplied; or

(2) make any publication whereby the data furnished by any particular establishment or individual under this title can be identified; or

(3) permit anyone other than the sworn officers and employees of the Department or bureau or agency thereof to examine the individual reports.

No department, bureau, agency, officer, or employee of the Government, except the Secretary in carrying out the purposes of this title, shall require, for any reason, copies of census reports which have been retained by any such establishment or individual. Copies of census reports which have been so retained shall be immune from legal process, and shall not, without the consent of the individual or establishment concerned, be admitted as evidence or used for any purpose in any action, suit, or other judicial or administrative proceeding.

(b) The provisions of subsection (a) of this section relating to the confidential treatment of data for particular individuals and establishments, shall not apply to the censuses of governments provided for by subchapter III of chapter 5 of this title, nor to interim current data provided for by subchapter IV of chapter 5 of this title as to the subjects covered by censuses of governments, with respect to any information obtained therefor that is compiled from, or customarily provided in, public records. (Aug. 31, 1954, c. 1158, 68 Stat. 1013; Oct. 15, 1962, Pub. L. 87-813, 76 Stat. 922; Nov. 7, 1990, Pub. L. 101-533, § 5(b)(2), 104 Stat. 2348; Oct. 31, 1994, Pub. L. 103-430, § 2(b), 108 Stat. 4394.)

**§ 11. Authorization of appropriations**

There is authorized to be appropriated, out of the Treasury of the United States, such sums as may be necessary to carry out all provisions of this title. (Aug. 31, 1954, c. 1158, 68 Stat. 1014.)

**§ 12. Mechanical and electronic development**

The Secretary is authorized to have conducted mechanical and electronic development work as he determines is needed to further the functions and duties of carrying out the purposes of this title and may enter into such developmental contracts as he may determine to be in the best interest of the Government. (Added Pub. L. 85-207, § 5, Aug. 28, 1957, 71 Stat. 481.)

**§ 13. Procurement of professional services**

The Secretary shall have authority to contract with educational and other research organizations for the preparation of monographs and other reports and materials of a similar nature. (Added Pub. L. 85-207, § 5, Aug. 28, 1957, 71 Stat. 481.)

## § 16. Address information reviewed by States and local governments<sup>1</sup>

- (a) The Secretary, to assist efforts to ensure the accuracy of censuses and surveys under this title, shall—
- (1) publish standards defining the content and structure of address information which States and local units of general purpose government may submit to the Secretary to be used in developing a national address list;
  - (2)(A) develop and publish a timetable for the Bureau to receive, review and respond to submissions of information under paragraph (1) before the decennial census date; and  
(B) provide for a response by the Bureau with respect to such submissions in which the Bureau specifies its determinations regarding such information and the reasons for such determinations; and
  - (3) be subject to the review process developed under section 3 of the Census Address List Improvement Act of 1994 relating to responses pursuant to paragraph (2).
- (b) (1) The Secretary—
- (A) shall provide officials who are designated as census liaisons by a local unit of general purpose government with access to census address information for the purpose of verifying the accuracy of the address information of the Bureau for census and survey purposes; and
  - (B) together with such access, should provide an explanation of duties and obligations under this title.
- (2) Access under paragraph (1) shall be limited to address information concerning addresses within the local unit of general purpose government represented by the census liaison or an adjacent local unit of general purpose government.
- (3) The Bureau should respond to each recommendation made by a census liaison concerning the accuracy of address information, including the determination (and reasons therefor) of the Bureau regarding each such recommendation.
- (4) For the purposes of paragraph (1), in a case in which a local unit of general purpose government is within another local unit of general purpose government and is not independent of the enclosing unit, the census liaison shall be designated by the local unit of general purpose government which is within the enclosing local unit of general purpose government.
- (5) A census liaison may not use information made available under paragraph (1) for any purpose other than the purpose specified in paragraph (1).
- (c) For the purposes of this section—
- (1) the term “local unit of general purpose government” has the meaning given such term by section 184(1) of this title; and
  - (2) the term “State” includes the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, American Samoa, Guam, the Virgin Islands, and any other territory or possession of the United States. (Added Pub. L. 103-430, § 2(a), Oct. 31, 1994, 108 Stat. 4393.)

## SUBCHAPTER II—OFFICERS AND EMPLOYEES

### § 21. Director of the Census; duties

The Bureau shall be headed by a Director of the Census, appointed by the President, by and with the advice and consent of the Senate. The Director shall perform such duties as may be imposed upon him by law, regulations, or orders of the Secretary. (Aug. 31, 1954, c. 1158, 68 Stat. 1014.)

### § 22. Qualifications of permanent personnel

All permanent officers and employees of the Bureau shall be citizens of the United States. (Aug. 31, 1954, c. 1158, 68 Stat. 1014; Sept. 13, 1960, Pub. L. 86-769, § 1, 74 Stat. 911.)

### § 23. Additional officers and employees

(a) The Secretary may establish, at rates of compensation to be fixed by him without regard to the Classification Act of 1949, as many temporary positions as may be necessary to meet the requirements of the work provided for by law. Bureau employees who are transferred to any such temporary positions shall not lose their permanent civil service status by reason of the transfer. The Secretary may make appointments to such temporary positions in conformity with the civil service laws and rules.

<sup>1</sup>Section 16 became law subsequent to the 1990 decennial census and did not apply to that census.

(b) In addition to employees of the Department of Commerce, employees of other departments and independent offices of the Government may, with the consent of the head of the respective department or office, be employed and compensated for field work in connection with the work provided for by law without regard to section 301 of the Dual Compensation Act.

(c) The Secretary may utilize temporary staff, including employees of Federal, State, or local agencies or instrumentalities, and employees of private organizations to assist the Bureau in performing the work authorized by this title, but only if such temporary staff is sworn to observe the limitations imposed by section 9 of this title. (Aug. 31, 1954, c. 1158, 68 Stat. 1014; Sept. 13, 1960, Pub. L. 86-769, § 2, 74 Stat. 911; Aug. 19, 1964, Pub. L. 88-448, Title IV, § 401(p), 78 Stat. 492; Oct. 17, 1976, Pub. L. 94-521, § 12(b), 90 Stat. 2465.)

## **§ 24. Special employment provisions**

(a) The Secretary may utilize the services of nontemporary employees of the Bureau (by assignment, promotion, appointment, detail, or otherwise) in temporary positions established for any census, for not to exceed the period during which appropriations are available for that census. Whenever the Secretary determines that the services of an employee which have been utilized under this section are no longer required in such a temporary position, he may, without regard to the provisions of any other law, return the employee to a continuing position, with rank and compensation not less than that which he held in his last permanent position in the Bureau: Provided, That no employee shall, by reason of his service in a temporary position under this subsection, lose the protection of any law or regulation with respect to his separation, suspension, furlough, or reduction in rank or compensation below the level held in his last permanent position in the Bureau. Service by a nontemporary employee in a temporary position under this subsection shall be creditable for step-increases (both periodic and longevity) under title VII of the Classification Act of 1949, as amended, as though it were a continuation of service in his last permanent position.

(b) As used in this title with respect to appointments or positions, "temporary" shall be construed to mean not in excess of one year, or not in excess of the specific period during which appropriations are available for the conduct of a particular census, whichever is longer. No employee of the Bureau who holds only a temporary appointment within the meaning of this section shall be considered as other than strictly temporary for purposes of any other provision of law relating to separations, suspensions, or reductions in rank or compensation.

(c) The enlisted men and officers of the uniformed services may be appointed and compensated for service in temporary enumerator positions for the enumeration of personnel of the uniformed services.

(d) The Secretary may fix compensation on a piece-price basis without limitation as to the amount earned per diem, and payments may be made to enumerators for the use of private automobiles on official business without regard to section 4 of the Travel Expense Act of 1949, as amended (5 U.S.C. 837), but at rates not in excess of the rates provided by that Act.

(e) The Secretary may authorize the expenditure of necessary sums for travel expenses of persons selected for appointment for attendance at training courses held by the Department of Commerce with respect to any of the work provided for by law.

(f) Notwithstanding any other provision of law prohibiting the expenditure of public money for telephone service, the Secretary, under such regulations as he shall prescribe, may authorize reimbursement for tolls or charges for telephone service from private residences or private apartments to the extent such charges are determined by the Secretary to have been incurred to facilitate the collection of information in connection with the censuses and surveys authorized by this title. (Aug. 31, 1954, c. 1158, 68 Stat. 1015; Sept. 13, 1960, Pub. L. 86-769, § 3, 74 Stat. 911; Aug. 31, 1964, Pub. L. 88-535, 78 Stat. 744.)

## **§ 25. Duties of supervisors, enumerators, and other employees**

(a) Each supervisor shall perform the duties imposed upon him by the Secretary in the enforcement of chapter 5 of this title in accordance with the Secretary's orders and instructions.

(b) Each enumerator or other employee detailed to serve as enumerator shall be charged with the collection in his subdivision of the facts and statistics called for on such schedules as the Secretary determines shall be used by him in connection with any census or survey provided for by chapter 5 of this title. (Aug. 31, 1954, c. 1158, 68 Stat. 1015; Aug. 31, 1964, Pub. L. 88-530, 78 Stat. 737.)

## § 26. Transportation by contract

The Secretary may contract with field employees for the rental and use within the continental limits of the United States of means of transportation, other than motorcycle, automobile, or airplane, and for the rental and use outside of the continental United States of any means of transportation, which means may be owned by the field employee. Such rental contracts shall be made without regard to section 4 of the Travel Expense Act of 1949, as amended (5 U.S.C. 837). The rentals shall be at rates equivalent to the prevailing rental rates of the locality. The rental contracts within the continental United States may be entered into only when the use by the field employee of such other means of transportation is safer, more economical, or more advantageous to the Government than use of his motorcycle, automobile, or airplane in conducting the census. (Added Pub. L. 85-207, § 6, Aug. 28, 1957, 71 Stat. 482.)

## CHAPTER 5—CENSUSES

### SUBCHAPTER II—POPULATION, HOUSING, AGRICULTURE, IRRIGATION,<sup>2</sup> AND UNEMPLOYMENT

## § 141. Population and other census information

(a) The Secretary shall, in the year 1980 and every 10 years thereafter, take a decennial census of population as of the first day of April of such year, which date shall be known as the "decennial census date," in such form and content as he may determine, including the use of sampling procedures and special surveys. In connection with any such census, the Secretary is authorized to obtain such other census information as necessary.

(b) The tabulation of total population by States under subsection (a) of this section as required for the apportionment of Representatives in Congress among the several States shall be completed within 9 months after the census date and reported by the Secretary to the President of the United States.

(c) The officers or public bodies having initial responsibility for the legislative apportionment or districting of each State may, not later than 3 years before the decennial census date, submit to the Secretary a plan identifying the geographic areas for which specific tabulations of population are desired. Each such plan shall be developed in accordance with criteria established by the Secretary, which he shall furnish to such officers or public bodies not later than April 1 of the fourth year preceding the decennial census date. Such criteria shall include requirements which assure that such plan shall be developed in a nonpartisan manner. Should the Secretary find that a plan submitted by such officers or public bodies does not meet the criteria established by him, he shall consult to the extent necessary with such officers or public bodies in order to achieve the alterations in such plan that he deems necessary to bring it into accord with such criteria. Any issues with respect to such plan remaining unresolved after such consultation shall be resolved by the Secretary, and in all cases he shall have final authority for determining the geographic format of such plan. Tabulations of population for the areas identified in any plan approved by the Secretary shall be completed by him as expeditiously as possible after the decennial census date and reported to the Governor of the State involved and to the officers or public bodies having responsibility for legislative apportionment or districting of such State, except that such tabulations of population of each State requesting a tabulation plan, and basic tabulations of population of each other State, shall, in any event, be completed, reported, and transmitted to each respective State within one year after the decennial census date.

(d) Without regard to subsections (a), (b), and (c) of this section, the Secretary, in the year 1985 and every 10 years thereafter, shall conduct a mid-decade census of population in such form and content as he may determine, including the use of sampling procedures and special surveys, taking into account the extent to which information to be obtained from such census will serve in lieu of information collected annually or less frequently in surveys or other statistical studies. The census shall be taken as of the first day of April of each such year, which date shall be known as the "mid-decade census date."

(e)(1) If—

(A) in the administration of any program established by or under Federal law which provides benefits to State or local governments or to other recipients, eligibility for or the amount of such benefits would (without regard to this paragraph) be determined by taking into account data obtained in the most recent decennial census, and

(B) comparable data is obtained in a mid-decade census conducted after such decennial census, then in the determination of such eligibility or amount of benefits the most recent data available from either the mid-decade or decennial census shall be used.

(2) Information obtained in any mid-decade census shall not be used for apportionment of Representatives in Congress among the several States, nor shall such information be used in prescribing congressional districts.

<sup>2</sup>So in original. Amendment by Pub.L. 99-544 has been executed pursuant to directory language which resulted in a double comma following "IRRIGATION."



(f) With respect to each decennial and mid-decade census conducted under subsection (a) or (d) of this section, the Secretary shall submit to the committees of Congress having legislative jurisdiction over the census—

(1) not later than 3 years before the appropriate census date, a report containing the Secretary's determination of the subjects proposed to be included, and the types of information to be compiled, in such census;

(2) not later than 2 years before the appropriate census date, a report containing the Secretary's determination of the questions proposed to be included in such census; and

(3) after submission of a report under paragraph (1) or (2) of this subsection and before the appropriate census date, if the Secretary finds new circumstances exist which necessitate that the subjects, types of information, or questions contained in reports so submitted be modified, a report containing the Secretary's determination of the subjects, types of information, or questions as proposed to be modified.

(g) As used in this section, "census of population" means a census of population, housing, and matters relating to population and housing. (Aug. 31, 1954, c. 1158, 68 Stat. 1019; Aug. 28, 1957, Pub. L. 85-207, § 9, 71 Stat. 483; Dec. 23, 1975, Pub. L. 94-171, § 1, 2(a), 89 Stat. 1023, 1024; Oct. 17, 1976, Pub. L. 94-521, § 7(a), 90 Stat. 2461.)

## SUBCHAPTER V—GEOGRAPHIC SCOPE, PRELIMINARY AND SUPPLEMENTAL STATISTICS, AND USE OF SAMPLING

### § 191. Geographic scope of censuses

(a) Each of the censuses authorized by this chapter shall include each State, the District of Columbia, the Virgin Islands, Guam, the Commonwealth of the Northern Mariana Islands, and the Commonwealth of Puerto Rico, and as may be determined by the Secretary, such other possessions and areas over which the United States exercises jurisdiction, control, or sovereignty. Inclusion of other areas over which the United States exercises jurisdiction or control shall be subject to the concurrence of the Secretary of State.

(b) For censuses taken in the Virgin Islands, Guam, the Commonwealth of the Northern Mariana Islands, or any possession or area not specifically designated in subsection (a) of this section, the Secretary may use census information collected by the Governor or highest ranking Federal official, if such information was obtained in accordance with plans prescribed or approved by the Secretary.

(c) If, pursuant to a determination by the Secretary under subsection (a) of this section, any census is not taken in a possession or area over which the United States exercises jurisdiction, control, or sovereignty, the Secretary may include data obtained from other Federal agencies or government sources in the census report. Any data obtained from foreign governments shall be obtained through the Secretary of State. (Added Pub. L. 85-207, § 14, Aug. 28, 1957, 71 Stat. 483, and amended Pub. L. 94-521, § 9, Oct. 17, 1976, 90 Stat. 2463.)

### § 193. Preliminary and supplemental statistics

In advance of, in conjunction with, or after the taking of each census provided for by this chapter, the Secretary may make surveys and collect such preliminary and supplementary statistics related to the main topic of the census as are necessary to the initiation, taking, or completion thereof. (Added Pub. L. 85-207, § 14, Aug. 28, 1957, 71 Stat. 484.) 195. Use of sampling Except for the determination of population for purposes of apportionment of Representatives in Congress among the several States, the Secretary shall, if he considers it feasible, authorize the use of the statistical method known as "sampling" in carrying out the provisions of this title. (Added Pub. L. 85-207, § 14, Aug. 28, 1957, 71 Stat. 484.)

### § 195. Use of sampling

Except for the determination of population for purposes of apportionment of Representatives in Congress among the several States, the Secretary shall, if he considers it feasible, authorize the use of the statistical method known as "sampling" in carrying out the provisions of this title. (Added Publ. L. 85-207, § 14, Aug. 28, 1957, 71 Stat. 484, and amended Pub. L. 94-521, § 10, Oct. 17, 1976, 90 Stat. 2464.)

### § 196. Special censuses

The Secretary may conduct special censuses for the government of any State, or of any county, city, or other political subdivision within a State, for the government of the District of Columbia, and for the government of any possession or area (including political subdivisions thereof) referred to in section 191(a) of this title, on subjects covered by the censuses provided for in this title, upon payment to the Secretary of the actual or estimated cost of each such special census. The results of each such special census shall be designated "Official Census Statistics." These statistics may be used in the manner provided by applicable law. (Added Pub. L. 94-521, § 11(a), Oct. 17, 1976, 90 Stat. 2464.)

## CHAPTER 7—OFFENSES AND PENALTIES

### SUBCHAPTER I—OFFICERS AND EMPLOYEES

#### § 211. Receiving or securing compensation for appointment of employees

Whoever—

(1) receives or secures to himself any fee, reward, or compensation as a consideration for the appointment of any person as supervisor, enumerator, clerk, or other officer or employee of the Department of Commerce or bureau or agency thereof, referred to in subchapter II of chapter 1 of this title; or

(2) in any way receives or secures to himself any part of the compensation paid to any person so appointed— shall be fined not more than \$3,000 or imprisoned not more than five years, or both. (Aug. 31, 1954, c. 1158, 68 Stat. 1022.)

#### § 212. Refusal or neglect of employees to perform duties

Whoever, being an employee referred to in subchapter II of chapter 1 of this title, and having taken and subscribed the oath of office, neglects or refuses, without justifiable cause, to perform the duties enjoined on such employee by this title, shall be fined not more than \$500. (Aug. 31, 1954, c. 1158, 68 Stat. 1022.)

#### § 213. False statements, certificates, and information

(a) Whoever, being an officer or employee referred to in subchapter II of chapter 1 of this title, willfully and knowingly swears or affirms falsely as to the truth of any statement required to be made or subscribed by him under oath by or under authority of this title, shall be guilty of perjury, and shall be fined not more than \$2,000 or imprisoned not more than five years, or both.

(b) Whoever, being an officer or employee referred to in subchapter II of chapter 1 of this title—

(1) willfully and knowingly makes a false certificate or fictitious return; or

(2) knowingly or willfully furnishes or causes to be furnished, or, having been such an officer or employee, knowingly or willfully furnished or caused to be furnished, directly or indirectly, to the Secretary or to any other officer or employee of the Department of Commerce or bureau or agency thereof, any false statement or false information with reference to any inquiry for which he was authorized and required to collect information provided for in this title— shall be fined not more than \$2,000 or imprisoned not more than five years, or both. (Aug. 31, 1954, c. 1158, 68 Stat. 1022.)

#### § 214. Wrongful disclosure of information

Whoever, being or having been an employee or staff member referred to in subchapter II of chapter 1 of this title, having taken and subscribed the oath of office, or having sworn to observe the limitations imposed by section 9 of this title or whoever, being or having been a census liaison within the meaning of section 16 of this title, publishes or communicates any information, the disclosure of which is prohibited under the provisions of section 9 of this title, and which comes into his possession by reason of his being employed (or otherwise providing services) under the provisions of this title, shall be fined not more than \$5,000 or imprisoned not more than 5 years, or both. (Aug. 31, 1954, c. 1158, 68 Stat. 1023; Oct. 17, 1976, Pub. L. 94-521, § 12(a), 90 Stat. 2464; Oct. 31, 1994, Pub. L. 103-430, § 2(c), 108 Stat. 4394.)

### SUBCHAPTER II—OTHER PERSONS

#### § 221. Refusal or neglect to answer questions; false answers

(a) Whoever, being over eighteen years of age, refuses or willfully neglects, when requested by the Secretary, or by any other authorized officer or employee of the Department of Commerce or bureau or agency thereof acting under the instructions of the Secretary or authorized officer, to answer, to the best of his knowledge, any of the questions on any schedule submitted to him in connection with any census or survey provided for by subchapters I, II, IV, and V of chapter 5 of this title, applying to himself or to the family to which he belongs or is related, or to the farm or farms of which he or his family is the occupant, shall be fined not more than \$100.

(b) Whoever, when answering questions described in subsection (a) of this section, and under the conditions or circumstances described in such subsection, willfully gives any answer that is false, shall be fined not more than \$500.

(c) Notwithstanding any other provision of this title, no person shall be compelled to disclose information relative to his religious beliefs or to membership in a religious body. (Aug. 31, 1954, c. 1158, 68 Stat. 1023; Aug. 28, 1957, Pub. L. 85-207, § 15, 71 Stat. 484; Oct. 17, 1976, Pub. L. 94-521, § 13, 90 Stat. 2465.)

**§ 222. Giving suggestions or information with intent to cause inaccurate enumeration of population**

Whoever, either directly or indirectly, offers or renders to any officer or employee of the Department of Commerce or bureau or agency thereof engaged in making an enumeration of population under subchapter II, IV, or V of chapter 5 of this title, any suggestion, advice, information or assistance of any kind, with the intent or purpose of causing an inaccurate enumeration of population to be made, shall be fined not more than \$1,000 or imprisoned not more than one year, or both. (Aug. 31, 1954, c. 1158, 68 Stat. 1023; Aug. 28, 1957, Pub. L. 85-207, § 16, 71 Stat. 484.)

**§ 223. Refusal, by owners, proprietors, etc., to assist census employees**

Whoever, being the owner, proprietor, manager, superintendent, or agent of any hotel, apartment house, boarding or lodging house, tenement, or other building, refuses or willfully neglects, when requested by the Secretary or by any other officer or employee of the Department of Commerce or bureau or agency thereof, acting under the instructions of the Secretary, to furnish the names of the occupants of such premises, or to give free ingress thereto and egress therefrom to any duly accredited representative of such Department or bureau or agency thereof, so as to permit the collection of statistics with respect to any census provided for in subchapters I and II of chapter 5 of this title, or any survey authorized by subchapter IV or V of such chapter in so far as such survey relates to any of the subjects for which censuses are provided by such subchapters I and II, including, when relevant to the census or survey being taken or made, the proper and correct enumeration of all persons having their usual place of abode in such premises, shall be fined not more than \$500. (Aug. 31, 1954, c. 1158, 68 Stat. 1023; Aug. 28, 1957, Pub. L. 85-207, § 17, 71 Stat. 484.)

**§ 225. Applicability of penal provisions in certain cases**

(a) In connection with any survey conducted by the Secretary or other authorized officer or employee of the Department of Commerce or bureau or agency thereof pursuant to subchapter IV of chapter 5 of this title, the provisions of sections 221, 222, 223 and 224 of this title shall apply—

(1) with respect to the answering of questions and furnishing of information, only to such inquiries as are within the scope of the schedules and questionnaires and of the type and character heretofore used in connection with the taking of complete censuses under subchapters I and II of chapter 5 of this title, or in connection with any censuses hereafter taken pursuant to such subchapters;

(2) only after publication of a determination with reasons therefor certified by the Secretary, or by some other authorized officer or employee of the Department of Commerce or bureau or agency thereof with the approval of the Secretary, that the information called for is needed to aid or permit the efficient performance of essential governmental functions or services, or has significant application to the needs of the public, business, or industry and is not publicly available from nongovernmental or other governmental sources;

(3) in the case of any new survey, only after public notice, given by the Secretary or other authorized officer or employee of the Department of Commerce or bureau or agency thereof at least thirty days in advance of requesting a return, that such survey is under consideration.

(b) The provisions for imprisonment provided by section 222 of this title shall not apply in connection with any survey conducted pursuant to subchapter II of chapter 3 of this title, or to subchapter IV of chapter 5 of this title.

(c) The provisions of sections 221, 222, 223, and 224 of this title shall not apply to any censuses or surveys of governments provided for by subchapters III and IV of chapter 5 of this title, nor to other surveys provided for by subchapter IV of such chapter which are taken more frequently than annually.

(d) Where the doctrine, teaching, or discipline of any religious denomination or church prohibits the disclosure of information relative to membership, a refusal, in such circumstances, to furnish such information shall not be an offense under this chapter. (Aug. 31, 1954, c. 1158, 68 Stat. 1024, Pub. L. 94-521, § 15(a), Oct. 17, 1976, 90 Stat. 2465.)

**SUBCHAPTER III—PROCEDURE**

**§ 241. Evidence**

When any request for information, made by the Secretary or other authorized officer or employee of the Department of Commerce or bureau or agency thereof, is made by registered or certified mail or telegram, the return receipt therefor or other written receipt thereof shall be prima facie evidence of an official request in any prosecution under such section. (Aug. 31, 1954, c. 1158, 68 Stat. 1025, Pub. L. 85-207, § 19, Aug. 28, 1957, 71 Stat. 484, Pub. L. 94-521, § 15(b), Oct. 17, 1976, 90 Stat. 2465.)

# APPENDIX 1B. Facsimile of 1990 Census Long-Form Questionnaire

CENSUS '90

## OFFICIAL 1990 U.S. CENSUS FORM



Thank you for taking time to complete and return this census questionnaire. It's important to you, your community, and the Nation.

### **The law requires answers but guarantees privacy.**

By law (Title 13, U.S. Code), you're required to answer the census questions to the best of your knowledge. However, the same law guarantees that your census form remains confidential. For 72 years—or until the year 2062—only Census Bureau employees can see your form. No one else—no other government body, no police department, no court system or welfare agency—is permitted to see this confidential information under any circumstances.

### **How to get started—and get help.**

Start by listing on the next page the names of all the people who live in your home. Please answer all questions with a black lead pencil. You'll find detailed instructions for answering the census in the enclosed guide. If you need additional help, call the toll-free telephone number to the left, near your address.

### **Please answer and return your form promptly.**

Complete your form and return it by April 1, 1990 in the postage-paid envelope provided. Avoid the inconvenience of having a census taker visit your home.

Again, thank you for answering the 1990 Census.  
**Remember: Return the completed form by April 1, 1990.**

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### **Para personas de habla hispana –** (For Spanish-speaking persons)

Si usted desea un cuestionario del censo en español, llame sin cargo alguno al siguiente número: **1-800-CUENTAN**  
(o sea 1-800-283-6826)

U.S. Department of Commerce  
BUREAU OF THE CENSUS  
FORM D-2

OMB No. 0607-0628  
Approval Expires 07/31/91

The 1990 census must count every person at his or her "usual residence." This means the place where the person lives and sleeps most of the time.

**1 a. List on the numbered lines below the name of each person living here on Sunday, April 1, including all persons staying here who have no other home. If EVERYONE at this address is staying here temporarily and usually lives somewhere else, follow the instructions given in question 1b below.**

**Include**

- Everyone who usually lives here such as family members, housemates and roommates, foster children, roomers, boarders, and live-in employees
- Persons who are temporarily away on a business trip, on vacation, or in a general hospital
- College students who stay here while attending college
- Persons in the Armed Forces who live here
- Newborn babies still in the hospital
- Children in boarding schools below the college level
- Persons who stay here most of the week while working even if they have a home somewhere else
- Persons with no other home who are staying here on April 1

**Do NOT include**

- Persons who usually live somewhere else
- Persons who are away in an institution such as a prison, mental hospital, or a nursing home
- College students who live somewhere else while attending college
- Persons in the Armed Forces who live somewhere else
- Persons who stay somewhere else most of the week while working

Print last name, first name, and middle initial for each person. Begin on line 1 with the household member (or one of the household members) in whose name this house or apartment is owned, being bought, or rented. If there is no such person, start on line 1 with any adult household member.

| LAST | FIRST | INITIAL | LAST | FIRST | INITIAL |
|------|-------|---------|------|-------|---------|
| 1    |       |         | 7    |       |         |
| 2    |       |         | 8    |       |         |
| 3    |       |         | 9    |       |         |
| 4    |       |         | 10   |       |         |
| 5    |       |         | 11   |       |         |
| 6    |       |         | 12   |       |         |

**1b. If EVERYONE is staying here only temporarily and usually lives somewhere else, list the name of each person on the numbered lines above, fill this circle  and print their usual address below. DO NOT PRINT THE ADDRESS LISTED ON THE FRONT COVER.**

|                           |  |                  |
|---------------------------|--|------------------|
| House number              | Street or road/Rural route and box number      | Apartment number |
| City                      | State  | ZIP Code         |
| County or foreign country | Names of nearest intersecting streets or roads |                  |

**NOW PLEASE OPEN THE FLAP TO PAGE 2 AND ANSWER ALL QUESTIONS FOR THE FIRST 7 PEOPLE LISTED. USE A BLACK LEAD PENCIL ONLY.**

| Please fill one column → for each person listed in Question 1a on page 1.   | PERSON 1  |                | PERSON 2  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
|---|---|----------------|---|----------------|---|---|---|---|---|---|---|---|---|---|---|--|--|---|--|--|--|--|--|--|---|---|---|---|---|---|---|---|---|---|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|--|--|--|--|---|---|---|---|---|---|---|---|---|---|--|--|---|--|--|--|--|--|--|---|---|---|---|---|---|---|---|---|---|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|---|---|---|--|--|--|
|   | Last name   |                | Last name   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
|   | First name  | Middle initial | First name  | Middle initial |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| <p><b>2. How is this person related to PERSON 1?</b></p> <p>Fill ONE circle for each person.</p> <p>If Other relative of person in column 1, fill circle and print exact relationship, such as mother-in-law, grandparent, son-in-law, niece, cousin, and so on.</p>  | <p>START in this column with the household member (or one of the members) in whose name the home is owned, being bought, or rented.</p> <p>If there is no such person, start in this column with any adult household member.</p>  |                | <p>If a RELATIVE of Person 1:</p> <p><input type="radio"/> Husband/wife      <input type="radio"/> Brother/sister</p> <p><input type="radio"/> Natural-born or adopted son/daughter      <input type="radio"/> Father/mother</p> <p><input type="radio"/> Stepson/stepdaughter      <input type="radio"/> Grandchild</p> <p><input type="radio"/> Other relative →</p> <p>If NOT RELATED to Person 1:</p> <p><input type="radio"/> Roomer, boarder, or foster child      <input type="radio"/> Unmarried partner</p> <p><input type="radio"/> Housemate, roommate      <input type="radio"/> Other nonrelative</p>  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| <p><b>3. Sex</b></p> <p>Fill ONE circle for each person.</p>  | <p><input type="radio"/> Male      <input type="radio"/> Female</p>   |                | <p><input type="radio"/> Male      <input type="radio"/> Female</p>   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| <p><b>4. Race</b></p> <p>Fill ONE circle for the race that the person considers himself/herself to be.</p> <p>If Indian (Amer.), print the name of the enrolled or principal tribe. →</p> <p>If Other Asian or Pacific Islander (API), print one group, for example: Hmong, Fijian, Laotian, Thai, Tongan, Pakistani, Cambodian, and so on. →</p> <p>If Other race, print race. →</p> | <p><input type="radio"/> White</p> <p><input type="radio"/> Black or Negro</p> <p><input type="radio"/> Indian (Amer.) (Print the name of the enrolled or principal tribe.) →</p> <p><input type="radio"/> Eskimo</p> <p><input type="radio"/> Aleut</p> <p><input type="radio"/> Asian or Pacific Islander (API)</p> <p><input type="radio"/> Chinese      <input type="radio"/> Japanese</p> <p><input type="radio"/> Filipino      <input type="radio"/> Asian Indian</p> <p><input type="radio"/> Hawaiian      <input type="radio"/> Samoan</p> <p><input type="radio"/> Korean      <input type="radio"/> Guamanian</p> <p><input type="radio"/> Vietnamese      <input type="radio"/> Other API →</p> <p><input type="radio"/> Other race (Print race) →</p> |                | <p><input type="radio"/> White</p> <p><input type="radio"/> Black or Negro</p> <p><input type="radio"/> Indian (Amer.) (Print the name of the enrolled or principal tribe.) →</p> <p><input type="radio"/> Eskimo</p> <p><input type="radio"/> Aleut</p> <p><input type="radio"/> Asian or Pacific Islander (API)</p> <p><input type="radio"/> Chinese      <input type="radio"/> Japanese</p> <p><input type="radio"/> Filipino      <input type="radio"/> Asian Indian</p> <p><input type="radio"/> Hawaiian      <input type="radio"/> Samoan</p> <p><input type="radio"/> Korean      <input type="radio"/> Guamanian</p> <p><input type="radio"/> Vietnamese      <input type="radio"/> Other API →</p> <p><input type="radio"/> Other race (Print race) →</p> |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| <p><b>5. Age and year of birth</b></p> <p>a. Print each person's age at last birthday. Fill in the matching circle below each box.</p> <p>b. Print each person's year of birth and fill the matching circle below each box.</p>   | <p>a. Age</p> <table border="1"> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>0</td><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>8</td><td>9</td><td> </td><td> </td></tr> </table>   |                |   |                |   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |  |  | <p>b. Year of birth</p> <table border="1"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>1</td><td>8</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>9</td><td>1</td><td>0</td><td>1</td><td> </td><td> </td></tr> <tr><td>2</td><td>0</td><td>2</td><td> </td><td> </td><td> </td></tr> <tr><td>3</td><td>0</td><td>3</td><td> </td><td> </td><td> </td></tr> <tr><td>4</td><td>0</td><td>4</td><td> </td><td> </td><td> </td></tr> <tr><td>5</td><td>0</td><td>5</td><td> </td><td> </td><td> </td></tr> <tr><td>6</td><td>0</td><td>6</td><td> </td><td> </td><td> </td></tr> <tr><td>7</td><td>0</td><td>7</td><td> </td><td> </td><td> </td></tr> <tr><td>8</td><td>0</td><td>8</td><td> </td><td> </td><td> </td></tr> <tr><td>9</td><td>0</td><td>9</td><td> </td><td> </td><td> </td></tr> </table> |  |  |  |  |  |  | 1 | 8 | 0 | 0 | 0 | 0 | 9 | 1 | 0 | 1 |  |  | 2 | 0 | 2 |  |  |  | 3 | 0 | 3 |  |  |  | 4 | 0 | 4 |  |  |  | 5 | 0 | 5 |  |  |  | 6 | 0 | 6 |  |  |  | 7 | 0 | 7 |  |  |  | 8 | 0 | 8 |  |  |  | 9 | 0 | 9 |  |  |  | <p>a. Age</p> <table border="1"> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>0</td><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>8</td><td>9</td><td> </td><td> </td></tr> </table> |  |  |  |  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |  |  | <p>b. Year of birth</p> <table border="1"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>1</td><td>8</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>9</td><td>1</td><td>0</td><td>1</td><td> </td><td> </td></tr> <tr><td>2</td><td>0</td><td>2</td><td> </td><td> </td><td> </td></tr> <tr><td>3</td><td>0</td><td>3</td><td> </td><td> </td><td> </td></tr> <tr><td>4</td><td>0</td><td>4</td><td> </td><td> </td><td> </td></tr> <tr><td>5</td><td>0</td><td>5</td><td> </td><td> </td><td> </td></tr> <tr><td>6</td><td>0</td><td>6</td><td> </td><td> </td><td> </td></tr> <tr><td>7</td><td>0</td><td>7</td><td> </td><td> </td><td> </td></tr> <tr><td>8</td><td>0</td><td>8</td><td> </td><td> </td><td> </td></tr> <tr><td>9</td><td>0</td><td>9</td><td> </td><td> </td><td> </td></tr> </table> |  |  |  |  |  |  | 1 | 8 | 0 | 0 | 0 | 0 | 9 | 1 | 0 | 1 |  |  | 2 | 0 | 2 |  |  |  | 3 | 0 | 3 |  |  |  | 4 | 0 | 4 |  |  |  | 5 | 0 | 5 |  |  |  | 6 | 0 | 6 |  |  |  | 7 | 0 | 7 |  |  |  | 8 | 0 | 8 |  |  |  | 9 | 0 | 9 |  |  |  |
|   |   |                |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 0   | 1   | 2              | 3   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 4   | 5   | 6              | 7   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 8   | 9   |                |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
|   |   |                |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 1   | 8   | 0              | 0   | 0              | 0 |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 9   | 1   | 0              | 1   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 2   | 0   | 2              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 3   | 0   | 3              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 4   | 0   | 4              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 5   | 0   | 5              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 6   | 0   | 6              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 7   | 0   | 7              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 8   | 0   | 8              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 9   | 0   | 9              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
|   |   |                |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 0   | 1   | 2              | 3   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 4   | 5   | 6              | 7   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 8   | 9   |                |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
|   |   |                |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 1   | 8   | 0              | 0   | 0              | 0 |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 9   | 1   | 0              | 1   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 2   | 0   | 2              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 3   | 0   | 3              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 4   | 0   | 4              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 5   | 0   | 5              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 6   | 0   | 6              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 7   | 0   | 7              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 8   | 0   | 8              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| 9   | 0   | 9              |   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| <p><b>6. Marital status</b></p> <p>Fill ONE circle for each person.</p>   | <p><input type="radio"/> Now married      <input type="radio"/> Separated</p> <p><input type="radio"/> Widowed      <input type="radio"/> Never married</p> <p><input type="radio"/> Divorced</p>   |                | <p><input type="radio"/> Now married      <input type="radio"/> Separated</p> <p><input type="radio"/> Widowed      <input type="radio"/> Never married</p> <p><input type="radio"/> Divorced</p>   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| <p><b>7. Is this person of Spanish/Hispanic origin?</b></p> <p>Fill ONE circle for each person.</p> <p>If Yes, other Spanish/Hispanic, print one group. →</p>   | <p><input type="radio"/> No (not Spanish/Hispanic)</p> <p><input type="radio"/> Yes, Mexican, Mexican-Am., Chicano</p> <p><input type="radio"/> Yes, Puerto Rican</p> <p><input type="radio"/> Yes, Cuban</p> <p><input type="radio"/> Yes, other Spanish/Hispanic (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.) →</p>  |                | <p><input type="radio"/> No (not Spanish/Hispanic)</p> <p><input type="radio"/> Yes, Mexican, Mexican-Am., Chicano</p> <p><input type="radio"/> Yes, Puerto Rican</p> <p><input type="radio"/> Yes, Cuban</p> <p><input type="radio"/> Yes, other Spanish/Hispanic (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.) →</p>  |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |
| <p><b>FOR CENSUS USE</b> →</p>  | <p><input type="radio"/></p> <p><input type="radio"/></p>   |                | <p><input type="radio"/></p> <p><input type="radio"/></p>   |                |   |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |  |  |  |  |  |  |   |   |   |   |   |   |   |   |   |   |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |   |   |   |  |  |  |

**PERSON 7**

Last name \_\_\_\_\_  
 First name \_\_\_\_\_ Middle initial \_\_\_\_\_

If a RELATIVE of Person 1:

Husband/wife     Brother/sister  
 Natural-born or adopted son/daughter     Father/mother or Grandchild  
 Stepson/stepdaughter     Other relative

If NOT RELATED to Person 1:

Roomer, boarder, or foster child     Unmarried partner  
 Housemate, roommate     Other nonrelative

Male     Female

White  
 Black or Negro  
 Indian (Amer.) (Print the name of the enrolled or principal tribe.)  
 Eskimo  
 Aleut  
 Asian or Pacific Islander (API)  
 Chinese     Japanese  
 Filipino     Asian Indian  
 Hawaiian     Samoan  
 Korean     Guamanian  
 Vietnamese     Other API  
 Other race (Print race)

a. Age    b. Year of birth

0 0 0 0 0 0    1 8 0 0 0 0  
 1 0 1 0 1 0    9 0 1 0 1 0  
 2 0 2 0    2 0 2 0  
 3 0 3 0    3 0 3 0  
 4 0 4 0    4 0 4 0  
 5 0 5 0    5 0 5 0  
 6 0 6 0    6 0 6 0  
 7 0 7 0    7 0 7 0  
 8 0 8 0    8 0 8 0  
 9 0 9 0    9 0 9 0

Now married     Separated  
 Widowed     Never married  
 Divorced

No (not Spanish/Hispanic)  
 Yes, Mexican, Mexican-Am., Chicano  
 Yes, Puerto Rican  
 Yes, Cuban  
 Yes, other Spanish/Hispanic (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.)

**NOW PLEASE ANSWER QUESTIONS H1a-H26 FOR THIS HOUSEHOLD**

**H1a.** Did you leave anyone out of your list of persons for Question 1a on page 1 because you were not sure if the person should be listed — for example, someone temporarily away on a business trip or vacation, a newborn baby still in the hospital, or a person who stays here once in a while and has no other home?

Yes, please print the name(s) and reason(s).  
 \_\_\_\_\_

No

**b.** Did you include anyone in your list of persons for Question 1a on page 1 even though you were not sure that the person should be listed — for example, a visitor who is staying here temporarily or a person who usually lives somewhere else?

Yes, please print the name(s) and reason(s).  
 \_\_\_\_\_

No

**H2.** Which best describes this building? Include all apartments, flats, etc., even if vacant.

A mobile home or trailer  
 A one-family house detached from any other house  
 A one-family house attached to one or more houses  
 A building with 2 apartments  
 A building with 3 or 4 apartments  
 A building with 5 to 9 apartments  
 A building with 10 to 19 apartments  
 A building with 20 to 49 apartments  
 A building with 50 or more apartments  
 Other

**H3.** How many rooms do you have in this house or apartment? Do NOT count bathrooms, porches, balconies, foyers, halls, or half-rooms.

1 room     4 rooms     7 rooms  
 2 rooms     5 rooms     8 rooms  
 3 rooms     6 rooms     9 or more rooms

**H4.** Is this house or apartment —

Owned by you or someone in this household with a mortgage or loan?  
 Owned by you or someone in this household free and clear (without a mortgage)?  
 Rented for cash rent?  
 Occupied without payment of cash rent?

If this is a ONE-FAMILY HOUSE —

**H5a.** Is this house on ten or more acres?

Yes     No

**b.** Is there a business (such as a store or barber shop) or a medical office on this property?

Yes     No

Answer only if you or someone in this household OWNS OR IS BUYING this house or apartment —

**H6.** What is the value of this property; that is, how much do you think this house and lot or condominium unit would sell for if it were for sale?

Less than \$10,000     \$70,000 to \$74,999  
 \$10,000 to \$14,999     \$75,000 to \$79,999  
 \$15,000 to \$19,999     \$80,000 to \$89,999  
 \$20,000 to \$24,999     \$90,000 to \$99,999  
 \$25,000 to \$29,999     \$100,000 to \$124,999  
 \$30,000 to \$34,999     \$125,000 to \$149,999  
 \$35,000 to \$39,999     \$150,000 to \$174,999  
 \$40,000 to \$44,999     \$175,000 to \$199,999  
 \$45,000 to \$49,999     \$200,000 to \$249,999  
 \$50,000 to \$54,999     \$250,000 to \$299,999  
 \$55,000 to \$59,999     \$300,000 to \$399,999  
 \$60,000 to \$64,999     \$400,000 to \$499,999  
 \$65,000 to \$69,999     \$500,000 or more

Answer only if you PAY RENT for this house or apartment —

**H7a.** What is the monthly rent?

Less than \$80     \$375 to \$399  
 \$80 to \$99     \$400 to \$424  
 \$100 to \$124     \$425 to \$449  
 \$125 to \$149     \$450 to \$474  
 \$150 to \$174     \$475 to \$499  
 \$175 to \$199     \$500 to \$524  
 \$200 to \$224     \$525 to \$549  
 \$225 to \$249     \$550 to \$599  
 \$250 to \$274     \$600 to \$649  
 \$275 to \$299     \$650 to \$699  
 \$300 to \$324     \$700 to \$749  
 \$325 to \$349     \$750 to \$999  
 \$350 to \$374     \$1,000 or more

**b.** Does the monthly rent include any meals?

Yes     No

**FOR CENSUS USE**

|                         |  |  |  |
|-------------------------|--|--|--|
| <b>A.</b> Total persons | <b>B.</b> Type of unit<br>Occupied    Vacant<br><input type="radio"/> First form <input type="radio"/> Regular<br><input type="radio"/> Cont'n <input type="radio"/> Usual home elsewhere  | <b>D.</b> Months vacant<br><input type="radio"/> Less than 1 <input type="radio"/> 6 up to 12<br><input type="radio"/> 1 up to 2 <input type="radio"/> 12 up to 24<br><input type="radio"/> 2 up to 6 <input type="radio"/> 24 or more   | <b>G.</b> DO <b>ID</b>   |
| 0 1 2 3 4 5 6 7 8 9     | <b>C1.</b> Vacancy status<br><input type="radio"/> For rent <input type="radio"/> For seas/rec/occ<br><input type="radio"/> For sale only <input type="radio"/> For migrant workers<br><input type="radio"/> Rented or sold, not occupied <input type="radio"/> Other vacant | <b>E.</b> Complete after<br><input type="radio"/> LR <input type="radio"/> TC <input type="radio"/> QA    JIC 1<br><input type="radio"/> P/F <input type="radio"/> RE <input type="radio"/> I/T<br><input type="radio"/> MV <input type="radio"/> ED <input type="radio"/> EN<br><input type="radio"/> P0 <input type="radio"/> P3 <input type="radio"/> P6<br><input type="radio"/> P1 <input type="radio"/> P4 <input type="radio"/> IA    JIC 2<br><input type="radio"/> P2 <input type="radio"/> P5 <input type="radio"/> SM | 0 0 0 0 0 0 0 0 0 0<br>1 1 1 1 1 1 1 1 1 1<br>2 2 2 2 2 2 2 2 2 2<br>3 3 3 3 3 3 3 3 3 3<br>4 4 4 4 4 4 4 4 4 4<br>5 5 5 5 5 5 5 5 5 5<br>6 6 6 6 6 6 6 6 6 6<br>7 7 7 7 7 7 7 7 7 7<br>8 8 8 8 8 8 8 8 8 8<br>9 9 9 9 9 9 9 9 9 9 |
|                         | <b>C2.</b> Is this unit boarded up?<br><input type="radio"/> Yes <input type="radio"/> No  | <b>F.</b> Cov.<br><input type="radio"/> 1b <input type="radio"/> 1a <input type="radio"/> 7 <input type="radio"/> H1   |  |



|   |  |   |
|---|--|---|
| <p><b>H8.</b> When did the person listed in column 1 on page 2 move into this house or apartment?</p> <p> <input type="radio"/> 1989 or 1990<br/> <input type="radio"/> 1985 to 1988<br/> <input type="radio"/> 1980 to 1984<br/> <input type="radio"/> 1970 to 1979<br/> <input type="radio"/> 1960 to 1969<br/> <input type="radio"/> 1959 or earlier         </p>  | <p><b>H14.</b> Which FUEL is used MOST for heating this house or apartment?</p> <p> <input type="radio"/> Gas: from underground pipes serving the neighborhood<br/> <input type="radio"/> Gas: bottled, tank, or LP<br/> <input type="radio"/> Electricity<br/> <input type="radio"/> Fuel oil, kerosene, etc.<br/> <input type="radio"/> Coal or coke<br/> <input type="radio"/> Wood<br/> <input type="radio"/> Solar energy<br/> <input type="radio"/> Other fuel<br/> <input type="radio"/> No fuel used         </p>  | <p><b>H20.</b> What are the yearly costs of utilities and fuels for this house or apartment? If you have lived here less than 1 year, estimate the yearly cost.</p> <p><b>a. Electricity</b></p> <p>\$ _____ .00<br/>Yearly cost — Dollars</p> <p>OR</p> <p> <input type="radio"/> Included in rent or in condominium fee<br/> <input type="radio"/> No charge or electricity not used         </p> |
| <p><b>H9.</b> How many bedrooms do you have; that is, how many bedrooms would you list if this house or apartment were on the market for sale or rent?</p> <p> <input type="radio"/> No bedroom<br/> <input type="radio"/> 1 bedroom<br/> <input type="radio"/> 2 bedrooms<br/> <input type="radio"/> 3 bedrooms<br/> <input type="radio"/> 4 bedrooms<br/> <input type="radio"/> 5 or more bedrooms         </p> | <p><b>H15.</b> Do you get water from —</p> <p> <input type="radio"/> A public system such as a city water department, or private company?<br/> <input type="radio"/> An individual drilled well?<br/> <input type="radio"/> An individual dug well?<br/> <input type="radio"/> Some other source such as a spring, creek, river, cistern, etc.?         </p>   | <p><b>b. Gas</b></p> <p>\$ _____ .00<br/>Yearly cost — Dollars</p> <p>OR</p> <p> <input type="radio"/> Included in rent or in condominium fee<br/> <input type="radio"/> No charge or gas not used         </p>   |
| <p><b>H10.</b> Do you have COMPLETE plumbing facilities in this house or apartment; that is, 1) hot and cold piped water, 2) a flush toilet, and 3) a bathtub or shower?</p> <p> <input type="radio"/> Yes, have all three facilities<br/> <input type="radio"/> No         </p>  | <p><b>H16.</b> Is this building connected to a public sewer?</p> <p> <input type="radio"/> Yes, connected to public sewer<br/> <input type="radio"/> No, connected to septic tank or cesspool<br/> <input type="radio"/> No, use other means         </p>  | <p><b>c. Water</b></p> <p>\$ _____ .00<br/>Yearly cost — Dollars</p> <p>OR</p> <p> <input type="radio"/> Included in rent or in condominium fee<br/> <input type="radio"/> No charge         </p>   |
| <p><b>H11.</b> Do you have COMPLETE kitchen facilities; that is, 1) a sink with piped water, 2) a range or cookstove, and 3) a refrigerator?</p> <p> <input type="radio"/> Yes<br/> <input type="radio"/> No         </p>   | <p><b>H17.</b> About when was this building first built?</p> <p> <input type="radio"/> 1989 or 1990<br/> <input type="radio"/> 1985 to 1988<br/> <input type="radio"/> 1980 to 1984<br/> <input type="radio"/> 1970 to 1979<br/> <input type="radio"/> 1960 to 1969<br/> <input type="radio"/> 1950 to 1959<br/> <input type="radio"/> 1940 to 1949<br/> <input type="radio"/> 1939 or earlier<br/> <input type="radio"/> Don't know         </p>  | <p><b>d. Oil, coal, kerosene, wood, etc.</b></p> <p>\$ _____ .00<br/>Yearly cost — Dollars</p> <p>OR</p> <p> <input type="radio"/> Included in rent or in condominium fee<br/> <input type="radio"/> No charge or these fuels not used         </p>   |
| <p><b>H12.</b> Do you have a telephone in this house or apartment?</p> <p> <input type="radio"/> Yes<br/> <input type="radio"/> No         </p>   | <p><b>H18.</b> Is this house or apartment part of a condominium?</p> <p> <input type="radio"/> Yes<br/> <input type="radio"/> No         </p>  |   |
| <p><b>H13.</b> How many automobiles, vans, and trucks of one-ton capacity or less are kept at home for use by members of your household?</p> <p> <input type="radio"/> None<br/> <input type="radio"/> 1<br/> <input type="radio"/> 2<br/> <input type="radio"/> 3<br/> <input type="radio"/> 4<br/> <input type="radio"/> 5<br/> <input type="radio"/> 6<br/> <input type="radio"/> 7 or more         </p>       | <p><i>If you live in an apartment building, skip to H20.</i></p> <p><b>H19a.</b> Is this house on less than 1 acre?</p> <p> <input type="radio"/> Yes — Skip to H20<br/> <input type="radio"/> No         </p> <p><b>b.</b> In 1989, what were the actual sales of all agricultural products from this property?</p> <p> <input type="radio"/> None<br/> <input type="radio"/> \$1 to \$999<br/> <input type="radio"/> \$1,000 to \$2,499<br/> <input type="radio"/> \$2,500 to \$4,999<br/> <input type="radio"/> \$5,000 to \$9,999<br/> <input type="radio"/> \$10,000 or more         </p> |   |

**INSTRUCTION:**  
 Answer questions H21 TO H26, if this is a one-family house, a condominium, or a mobile home that someone in this household OWNS OR IS BUYING; otherwise, go to page 6.

H21. What were the real estate taxes on THIS property last year?

\$    .00  
 Yearly amount — Dollars

OR

None

H22. What was the annual payment for fire, hazard, and flood insurance on THIS property?

\$    .00  
 Yearly amount — Dollars

OR

None

H23a. Do you have a mortgage, deed of trust, contract to purchase, or similar debt on THIS property?

Yes, mortgage, deed of trust, or similar debt } Go to H23b  
 Yes, contract to purchase }  
 No — Skip to H24a

b. How much is your regular monthly mortgage payment on THIS property? Include payment only on first mortgage or contract to purchase.

\$    .00  
 Monthly amount — Dollars

OR

No regular payment required — Skip to H24a

c. Does your regular monthly mortgage payment include payments for real estate taxes on THIS property?

Yes, taxes included in payment  
 No, taxes paid separately or taxes not required

d. Does your regular monthly mortgage payment include payments for fire, hazard, or flood insurance on THIS property?

Yes, insurance included in payment  
 No, insurance paid separately or no insurance

H24a. Do you have a second or junior mortgage or a home equity loan on THIS property?

Yes  
 No — Skip to H25

b. How much is your regular monthly payment on all second or junior mortgages and all home equity loans?

\$    .00  
 Monthly amount — Dollars

OR

No regular payment required

*Answer ONLY if this is a CONDOMINIUM —*  
 H25. What is the monthly condominium fee?

\$    .00  
 Monthly amount — Dollars

*Answer ONLY if this is a MOBILE HOME —*  
 H26. What was the total cost for personal property taxes, site rent, registration fees, and license fees on this mobile home and its site last year? Exclude real estate taxes.

\$    .00  
 Yearly amount — Dollars

Please turn to page 6. ➔

0  
1  
2  
3  
4  
5  
6  
7  
8  
9



**23a. How did this person usually get to work LAST WEEK?** If this person usually used more than one method of transportation during the trip, fill the circle of the one used for most of the distance.

Car, truck, or van       Motorcycle  
 Bus or trolley bus       Bicycle  
 Streetcar or trolley car       Walked  
 Subway or elevated       Worked at home  
 Railroad       Skip to 28  
 Ferryboat       Other method  
 Taxicab

If "car, truck, or van" is marked in 23a, go to 23b. Otherwise, skip to 24a.

**b. How many people, including this person, usually rode to work in the car, truck, or van LAST WEEK?**

Drove alone       5 people  
 2 people       6 people  
 3 people       7 to 9 people  
 4 people       10 or more people

**24a. What time did this person usually leave home to go to work LAST WEEK?**

a.m.  
 p.m.

**b. How many minutes did it usually take this person to get from home to work LAST WEEK?**

Minutes — Skip to 28

**25. Was this person TEMPORARILY absent or on layoff from a job or business LAST WEEK?**

Yes, on layoff  
 Yes, on vacation, temporary illness, labor dispute, etc.  
 No

**26a. Has this person been looking for work during the last 4 weeks?**

Yes  
 No — Skip to 27

**b. Could this person have taken a job LAST WEEK if one had been offered?**

No, already has a job  
 No, temporarily ill  
 No, other reasons (in school, etc.)  
 Yes, could have taken a job

**27. When did this person last work, even for a few days?**

1990       1980 to 1984  
 1989       1979 or earlier  
 1988       Never worked  
 1985 to 1987

Go to 28 or Skip to 32

**28-30. CURRENT OR MOST RECENT JOB ACTIVITY.** Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours. If this person had no job or business last week, give information for his/her last job or business since 1985.

**28. Industry or Employer**

**a. For whom did this person work?** If now on active duty in the Armed Forces, fill this circle  and print the branch of the Armed Forces.

(Name of company, business, or other employer)

**b. What kind of business or industry was this?** Describe the activity at location where employed.

(For example: hospital, newspaper publishing, mail order house, auto engine manufacturing, retail bakery)

**c. Is this mainly — Fill ONE circle**

Manufacturing       Other (agriculture, construction, service,  
 Wholesale trade      government, etc.)  
 Retail trade

**29. Occupation**

**a. What kind of work was this person doing?**

(For example: registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, cake icer)

**b. What were this person's most important activities or duties?**

(For example: patient care, directing hiring policies, supervising order clerks, assembling engines, icing cakes)

**30. Was this person — Fill ONE circle**

- Employee of a PRIVATE FOR PROFIT company or business or of an individual, for wages, salary, or commissions
- Employee of a PRIVATE NOT-FOR-PROFIT, tax-exempt, or charitable organization
- Local GOVERNMENT employee (city, county, etc.)
- State GOVERNMENT employee
- Federal GOVERNMENT employee
- SELF-EMPLOYED in own NOT INCORPORATED business, professional practice, or farm
- SELF-EMPLOYED in own INCORPORATED business, professional practice, or farm
- Working WITHOUT PAY in family business or farm

**31a. Last year (1989), did this person work, even for a few days, at a paid job or in a business or farm?**

Yes  
 No — Skip to 32

**b. How many weeks did this person work in 1989?** Count paid vacation, paid sick leave, and military service.

Weeks

**c. During the weeks WORKED in 1989, how many hours did this person usually work each week?**

Hours

**32. INCOME IN 1989 —**

Fill the "Yes" circle below for each income source received during 1989. Otherwise, fill the "No" circle. If "Yes," enter the total amount received during 1989. For income received jointly, see instruction guide. If exact amount is not known, please give best estimate. If net income was a loss, write "Loss" above the dollar amount.

**a. Wages, salary, commissions, bonuses, or tips from all jobs — Report amount before deductions for taxes, bonds, dues, or other items.**

Yes  
 No      \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**b. Self-employment income from own nonfarm business, including proprietorship and partnership — Report NET income after business expenses.**

Yes  
 No      \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**c. Farm self-employment income — Report NET income after operating expenses. Include earnings as a tenant farmer or sharecropper.**

Yes  
 No      \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**d. Interest, dividends, net rental income or royalty income, or income from estates and trusts — Report even small amounts credited to an account.**

Yes  
 No      \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**e. Social Security or Railroad Retirement**

Yes  
 No      \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**f. Supplemental Security Income (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments.**

Yes  
 No      \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**g. Retirement, survivor, or disability pensions — Do NOT include Social Security.**

Yes  
 No      \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**h. Any other sources of income received regularly such as Veterans' (VA) payments, unemployment compensation, child support, or alimony — Do NOT include lump-sum payments such as money from an inheritance or the sale of a home.**

Yes  
 No      \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

**33. What was this person's total income in 1989?** Add entries in questions 32a through 32h; subtract any losses. If total amount was a loss, write "Loss" above amount.

None      OR      \$ \_\_\_\_\_ .00  
 Annual amount — Dollars

Please turn the page and answer questions for Person 2 listed on page 1. If this is the last person listed in question 1a on page 1, go to the back of the form.

# APPENDIX 1C.

## Table of Residence Rules for the 1990 Census

This table identifies the “usual residence” of a person, that is, the place where a person should be counted in the census. “Usual residence” is defined as the place where the person lives and sleeps most of the time. Column 1

describes the living situation (college student, member of the Armed Forces, etc.), and column 2 identifies where that person should be counted.

| <b>Column 1</b>  | <b>Column 2</b>  |
|--|--|
| <u>Situation</u>   | <u>Person is a usual resident of</u>   |
| 1. Person lives in this household but is temporarily absent on a visit, business trip, vacation, in connection with a job (e.g., bus driver, traveling salesperson, boat operator) | This household   |
| 2. Lives in this household on weekends only. Works most of the week in another place and maintains a place to live there   | The other household  |
| 3. Lives in this household but is in a general or a Veterans Administration hospital. Includes babies who have not yet been brought home   | This household, unless in a psychiatric or chronic disease ward; if so, the person will be listed in the hospital                |
| 4. Person is a member of the Armed Forces:   |  |
| a. Living on a military installation in the United States  | The military installation  |
| b. Stationed on a nearby military installation or ship but living off base in this household   | This household (the person will also receive a census form through his or her military unit, and should be listed on both forms) |
| c. Assigned to a military vessel which is “deployed” to the 6th or 7th Fleet   | DO NOT LIST  |
| d. Assigned to a military base outside the United States   | DO NOT LIST  |
| 5. Person is a college student:  |  |
| a. Not living in this household during the school year—here only on vacation   | Place where he/she lives while attending college   |
| b. Living in this household during the school year   | This household   |
| 6. Person is a student attending school below the college level such as a boarding school or a Bureau of Indian Affairs boarding school  | This household   |
| 7. Person is under formally authorized, supervised care or custody, in special places such as:   |  |
| a. Correctional institutions, such as Federal and State prisons, local jails or workhouses, federal detention centers, and halfway houses  | The special place  |
| b. Nursing, convalescent, and rest homes for the aged and dependent  | The special place  |

| Column 1  | Column 2   |
|---|--|
| <u>Situation</u>  | <u>Person is a usual resident of</u>   |
| c. Juvenile institutions, such as schools for delinquents   | The special place  |
| d. Homes, schools, hospitals, or wards for physically handicapped, mentally retarded, or mentally ill patients  | This special place   |
| 8. Persons in camps for temporary workers such as agricultural migrant worker, logging, pipeline, or construction                                     | The camp   |
| 9. Person is an officer or crew member of a merchant vessel engaged in coastwise, intercoastal, or foreign transportation (including the Great Lakes) | The merchant vessel  |
| 10. Person is a officer or crew member of a merchant vessel engaged in inland waterway transportation   | This household   |
| 11. Person is a member of a religious order living in a monastery or convent  | The monastery or convent   |
| 12. Person is a staff member living in a hospital or nursing home   | The hospital or nursing home   |
| 13. Person who has more than one home and divides time between them   | The household where he/she spends the greater part of the calendar year  |
| 14. Person is a domestic worker who "lives in"  | Determine if the worker occupies a housing unit separate from the main household:<br>If "NO," list on this household questionnaire<br>If "YES," list on a separate census questionnaire  |
| 15. Person is staying temporarily in this household   | Determine if the visitor has another home:<br>If "NO," list on this household questionnaire<br>If "YES," ask if there is someone at home to report the person to the census taker:<br>If "NO," list the person on an individual census report, including his/her home address<br>If "YES," do not list |
| 16. Person is an American citizen overseas:   |  |
| a. On vacation or temporarily away on a business trip   | This household   |
| b. Employed by the U.S. Government with place of duty abroad, including family members living with them   | DO NOT LIST  |
| c. Any other American working, studying, or living abroad   | DO NOT LIST  |
| 17. Person is a citizen of a foreign country:   |  |
| a. Who has established a household while working or studying, including family members living with them   | This household   |
| b. Temporarily traveling or visiting in the United States   | DO NOT LIST  |
| c. Living on the premises of an Embassy, Ministry, Legation, Chancellery, or Consulate  | DO NOT LIST  |