

Appendix A

How the Survey Was Conducted

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Introduction

The Residential Transportation Energy Consumption Survey (RTECS) was designed by the Energy Information Administration (EIA) to provide data about vehicles that are used for personal transportation in the United States. These data include the motor vehicle stock, the vehicle miles traveled (VMT), and the vehicle fuel consumption and expenditures. The RTECS is a companion survey to the Residential Energy Consumption Survey (RECS), which collects household energy consumption and expenditure data. The RTECS collects vehicle information through a telephone interview with a representative national sample of households. Copies of the data collection forms are provided in Appendix D, "Survey Forms." The 1991 RTECS is the fourth such survey covering a calendar year conducted by EIA; previous surveys were collected in 1983, 1985 and 1988. Prior to the 1983 RTECS, monthly surveys were conducted from June 1979 to September 1981. Beginning with 1985, the surveys have been conducted triennially, with the next one scheduled in 1994.

This appendix provides detailed information concerning: (1) the RTECS survey design, including a comparison between the 1991 and previous years RTECS designs; (2) the sample design; (3) the data-collection procedures; (4) the Vehicle Identification Number (VIN); (5) interviewer training; (6) efforts undertaken to minimize the nonresponse biases; (7) survey estimate weights; (8) data-editing procedures; (9) data-preparation procedures; and (10) data confidentiality and the preparation of the public-use data tape.

Changes in Survey Design and Data Collection

The survey design for the 1991 RTECS was unchanged from the 1988 survey, but there were several additional questions and minor changes in the data collection procedures. Fuel efficiencies continue to be estimated by using the Environmental Protection Agency (EPA) laboratory-test miles per gallon (MPG) adjusted for on-road fuel efficiency shortfall. (See Appendix B, "Estimation Methodologies," for further discussion.) Major details of the 1991 RTECS design and data collection included the following:

- The sample size of the 1991 RTECS was 3,045 households, similar to the 1988 RTECS which had 2,986 households.
- Respondents in the 1991 RTECS were once again not asked to maintain monthly fuel-purchase diaries.
- The number of contacts with respondents required to collect the data in 1991 was 10 per household.
- In 1991, MPG and fuel-price data were estimated in the same manner as in 1988. MPG data were estimated using adjusted test laboratory MPG as recorded on the EPA Emissions Certification files. Fuel-price data were obtained from the Bureau of Labor Statistics (BLS) gasoline pump price series and the Lundberg Survey, Inc., price series. (See Appendix B, "Estimation Methodologies," for a detailed discussion of the estimation procedures used in this report.)

- Respondents were again asked to provide the VIN for each vehicle. The decoded VIN was used to enhance the accuracy of reported vehicle characteristics. These characteristics were used to match sampled vehicles to the EPA Certification files. (See "The Vehicle Identification Number" section in this appendix for a detailed discussion of the VIN).

- Households in the 1991 RTECS, as in 1988, did not receive a monetary incentive to participate, as they did in the 1985 RTECS.

Sample Design

The sample design for the 1991 RTECS consisted of a core (self-weighting) national sample of households plus an oversample of high-mileage households. (See "Glossary" for definition of High-Mileage Households.) Oversampling high-mileage households allowed the RTECS to: (1) collect data on more vehicles, and (2) provide better estimates for major statistics such as VMT and vehicle stock.

As of July 1991, the target population for the RTECS was estimated at 94.6 million households, based on adjusted estimates of households from the U.S. Bureau of the Census, *Current Population Survey* (CPS). The universe for the RTECS is comprised of all housing units occupied as the primary residence in the 50 States and the District of Columbia. (See "Glossary" for a definition of Housing Unit.) The sample of households selected for the 1991 RTECS was based on the 1990 RECS multistage area probability sample. The RECS incorporates a rotating panel that allows the observation of changes in energy use over time when the same households are in two successive surveys. The original RECS sample consisted of 6,757 units, of which 150 either were not used for dwelling purposes or were not habitable. Of the 6,607 habitable housing units, 698 units were considered ineligible either because of current vacancies or seasonal occupancy. Of the 5,909 eligible units, energy-related information was collected from 4,828 households, for an 81.7 percent response rate for the RECS. An additional 267 responses were obtained from a mail follow up for a total of 5,095 responding households. (See *Housing Characteristics 1990* (published May 1992), DOE/EIA-0314(90), GPO Stock No. 061-003-00754-6 for a detailed discussion of the RECS Sample Design.)

The RTECS sample consisted of 3,045 housing units selected from the 5,095 available 1990 RECS housing units for which data were successfully collected.

The fraction of RECS housing units selected for RTECS was 59.8 percent. At the beginning of the data collection period in January 1991, 2,842 (93.3 percent) of the 3,045 housing units were identified as housing units that could potentially be contacted by telephone, and 200 housing units (6.6 percent) were identified as households that could not be contacted by telephone, either because they did not have telephones, had unlisted numbers, or refused to provide a telephone number during the RECS interview. This group was classified as mail households and data were collected from these households via a mailed questionnaire rather than a telephone interview. Contact was not attempted for an additional 3 households. By the end of the RTECS survey cycle (February 1992), the percent of households considered mail households had increased to 485, or 16 percent, because of an increased number of households with unlisted numbers or disconnected telephones.

The 1991 RTECS sample was selected in two groups. This was necessary because the Beginning-of-Year (B-O-Y) RTECS contacts were scheduled to begin in early January 1991, before the completion of the 1990 RECS interviews. The first RTECS sample group was selected from the RECS households that had completed RECS interviews as of November 1990. The RTECS interviews for this group were scheduled for early January 1991. The first calls to households began the night of the attack on Kuwait by the United States. A decision was made to halt collection, and resume calls in February. The second RTECS sample group was selected from the RECS households that had completed RECS interviews as of January 31, 1991. The RTECS interviews for this group began in March 1991.

Data Collection

The RTECS was divided into four data collection phases. The first phase occurred as part of the RECS personal interview. During this interview, the household's vehicle stock was enumerated, and when possible, the VIN and the odometer reading for each vehicle were recorded. Household characteristics were also collected. The vehicle inventory collected at this time provided a baseline for the remaining three data-collection phases. Phases two through four: B-O-Y data collection, Mid-Year (M-Y) data-collection, and End-of-Year (E-O-Y) data collection, respectively, were conducted via telephone interviews. For households that could not be contacted by telephone, the data were collected via a mail questionnaire.

B-O-Y and E-O-Y Data-Collection Phase: Data collected during the B-O-Y and E-O-Y phases consisted of an update of the vehicle stock and the following vehicle characteristics for each vehicle recorded: the make, model and model year, engine size, fuel system type, and transmission type; vehicle fuel characteristics such as the fuel type, fuel grade and type of pump service; odometer readings; and VIN. See below for description of M-Y data collection.

One week prior to each B-O-Y, M-Y, and E-O-Y data collection, a mailing was sent to the RTECS respondents. The B-O-Y and the E-O-Y mailings consisted of the following: (1) Odometer Reading Cards; (2) VIN cards; (3) a page of instructions; (4) a letter from the Director of the Office of Energy Markets and End Use of the EIA explaining the survey; and (5) a letter from the survey contractor explaining their role in the survey. (See "Data Collection Instruments" listed below in this appendix.)

M-Y Data-Collection Phase: The M-Y mailing consisted of a letter from the Director of the Office of Energy Markets and End Use and a vehicle update worksheet for the respondents to complete. At this time, no vehicle characteristic data were obtained; only an inventory update was collected. The respondent was instructed to either keep the worksheet by the telephone for the telephone interview or return the worksheet by mail, if the household was classified as a no-telephone household. A vehicle-shaped magnet was included in the mailing to the no-telephone households. Any respondent who had refused at the B-O-Y interview was not contacted during the M-Y data collection phase. These households were not contacted at the M-Y interview, in order to increase the probability that the household would respond to the E-O-Y data collection. During the telephone interview, data were collected using the RTECS questionnaires.

Data Collection Dates

The initial enumeration of vehicle stock and the characteristics of the households were collected in the fall of 1990. The B-O-Y data collection occurred during the end of February 1991 through early April 1991. The M-Y update occurred in July and August 1991, and the E-O-Y data collection took place during January and February 1992.

Data-Collection Instruments

The data-collection instruments for the RTECS consisted of four types: (1) the 1990 RECS questionnaire, (2) Odometer Reading Card, (3) Vehicle Identification Number Card, and (4) RTECS questionnaires. (See Appendix D, "Survey Forms," for examples of these data collection instruments.)

1990 Residential Energy Consumption Survey Questionnaire (Form EIA-457A)--This form was used during the RECS personal interview. Questions on this form included the number of vehicles in the household, and for each

vehicle: the VIN; the vehicle type; the vehicle make, model, and model year; the odometer reading; and estimated miles traveled during the past year or since the vehicle was acquired, if the vehicle was acquired within the previous 12 months. Household characteristics questions included the number of household members, and for each household member: their age, gender, employment status, and relationship to the head of household. The education level and

ethnic background were collected for the head of the household only. The number of drivers, annual family income, and income assistance were collected for the household.

Odometer Reading Card (Form EIA-876A,D)--This form was mailed to the respondent prior to the B-O-Y and E-O-Y data collections and was used as a reference by the respondent during the telephone interview. The card was used to record, on an assigned date, the odometer readings for each reported vehicle during both the B-O-Y and E-O-Y data collections. A computer-generated label attached to the card identified each vehicle by make, model, and year of the vehicle. The respondents were instructed to enter the vehicle's odometer reading on the card after the last use of the vehicle on the specified assigned date. For the B-O-Y data collection, respondents were assigned one of the following dates: February 25, March 4, March 11, or March 18, 1991. For the E-O-Y data collection, they were assigned either of the following dates: January 4, January 12, January 19, or January 26, 1992. No odometer reading cards were provided during the M-Y data collection. An additional odometer reading card without a computer-generated label was included for the respondent to record odometer readings for any vehicle acquired since the last contact.

VIN Card (Form EIA-876)--This form was mailed to the respondent and used as a reference during the telephone interview. The card was used to record the VIN for each reported vehicle. Each VIN card had a computer-generated label identifying the specific vehicle assigned to the card. A thorough explanation of the VIN and where to locate it was provided on the card. A blank VIN card was also provided to record the VIN for any vehicle acquired since the last contact. For the B-O-Y data collection, the VIN cards were mailed only if the VIN was not obtained during the RECS interview or if the VIN had been transcribed incorrectly. For the E-O-Y data collection, the VIN was collected only from households that had acquired a new vehicle at the M-Y data collection phase. Households were not mailed a VIN card if they had refused to provide a VIN during any previous RTECS contact, at the time of the RECS contact, or if they were previously classified as a nonrespondent household.

The odometer and VIN cards were mailed to the respondents approximately 1 week prior to the telephone interview. The respondents were requested to keep both the odometer and VIN cards by their telephones so they would be readily available when the interviewer telephoned. If the household was classified as a no-telephone household, the respondent was requested to return the cards in a self-stamped, business reply envelope that was provided.

Residential Transportation Energy Consumption Survey Questionnaire (Form EIA-876A-C)--This form was used by the telephone interviewer to record information gathered during the telephone interviews. Vehicle data obtained with this questionnaire included: verification of the stock of vehicles; motor vehicle characteristics for each vehicle, such as transmission type, drive type, fuel system type, engine size, and number of cylinders; vehicle fuel characteristics such as fuel type, fuel grade and type of pump service; odometer readings; and VIN. The questionnaire consisted of three types: the B-O-Y telephone questionnaire (Form EIA-876A), the M-Y mail and telephone questionnaire (Form EIA-876B), and the E-O-Y telephone questionnaire (Form EIA-876C).

The B-O-Y and E-O-Y telephone questionnaires were used only by the telephone interviewers to record respondents answers during the telephone interview. These questionnaires were divided into discrete sections that were color-coded to help the interviewer in determining the correct skip patterns.

B-O-Y Questionnaire: The discrete sections for the B-O-Y Questionnaire consisted of:

- A call record sheet and protocol.
- Questions pertaining to vehicle characteristics for only vehicles that were recorded during the RECS interview. A computer-generated fold-out page was included that listed the make, model and year of all vehicles obtained during the RECS interview. The status of the VIN was also included (whether

it was obtained, or whether it was transcribed correctly).

- Questions pertaining to vehicles that were disposed of since the RECS interview

- Questions pertaining to vehicles acquired since the RECS interview or any vehicles not recorded during the RECS interview
- Questions pertaining to the household's intention to move within 12 months.

M-Y Questionnaire: The M-Y Questionnaire that was mailed to the respondents requested only minimal vehicle update information on the acquisition and disposition of vehicles since the B-O-Y data collection. Respondents with telephones were requested to complete the form and to keep it by the telephone in preparation for the telephone interview. The respondents without telephones were requested to complete and return the form to the survey contractor. The M-Y questionnaire used by the telephone interviewers to record the respondents answers contained:

- A call record sheet and protocol
- Computer-generated pages showing the most recent vehicle inventory for the household
- Questions relating to the vehicles disposed of since the RECS interview or the B-O-Y interview
- Questions relating to the vehicles acquired since the RECS interview or the B-O-Y interview
- Questions pertaining to the household's intention to move within the following 6 months.

Note: For a selected number of households, additional questions pertaining to government assistance to low-income households and interruptions in home heating were asked at the end of the RTECS interviews. These data, collected as part of the Family Support Administration (FSA) update to RECS, were completely independent from the RTECS questions. The FSA questions were collected during the RTECS data collection as a cost-saving measure and as a method of reducing the respondent burden by combining the two telephone contacts into one telephone call.

E-O-Y Questionnaire: Two types of questionnaires were used for the E-O-Y data collection, depending on the responses at the M-Y interview. For households that had indicated at the M-Y update that they had acquired or disposed of a vehicle, the questionnaire contained two additional sections. The first new section pertained to acquired vehicles and contained questions about the vehicle characteristics, the VIN, and the odometer reading. The second section pertained to disposed vehicles. An additional computer printout was included listing the new vehicles obtained at the M-Y. For households that did not indicate at the M-Y update that they had acquired or disposed of a vehicle, the questionnaire was similar to the B-O-Y questionnaire, including questions pertaining to vehicle acquisitions and disposals since the last contact. A section on other transportation modes was also added. Questions relating to the household's intention to move were eliminated.

Vehicle Identification Number

In the 1991 survey, respondents were again asked to provide the VINs for their vehicles. The VIN is a unique identification number assigned to a vehicle by the automobile manufacturers for the purpose of identification.

Beginning with the 1981 vehicle model year, the U.S. Department of Transportation (DOT) has required that a standard identification format consisting of 17 characters be attached to all over-the-road vehicles sold in the United States. Between 1954 and the 1981 DOT standard, automobile manufacturers in the United States had included an 11- to 15-digit VIN on all vehicles.

In the 1991 RTECS, the MPG data were estimated using EPA laboratory test results of MPG (See Appendix B,

"Estimation Methodologies," for a complete discussion of the consumption and expenditure estimation procedures used in the 1991 RTECS.) To assign a test MPG to a particular vehicle, the specific characteristics of the vehicle were required. In the 1991 RTECS, these vehicle characteristics were obtained from two sources: (1) the decoded VIN's, and (2) the RTECS questions about vehicle characteristics that the respondent answered. The 1991 RTECS also provided a unique opportunity to assess the reliability of the respondents' answers by comparing their responses to the RTECS vehicle characteristic questions with an independent source of data containing the vehicle characteristics for the same vehicles, that is, the VIN.

The Decoded VIN

The VIN is a sequence of numbers and letters that, when decoded, provides vehicle characteristics that range from the nation of origin to the individual assembly plant where the vehicle was manufactured. The first three characters of the standard VIN format, designated as the World Manufacturers Identification (WMI), identify the nation of origin, the manufacturer, and the vehicle make. The next five characters are the Vehicle Description Section (VDS). These characters identify the vehicle model; the body type such as sedan or station wagon; the engine type, which includes characteristics like the number of cylinders, cubic inch displacement and net brake horsepower; the restraint system found in the vehicle; and a model change code. There is no fixed format or standard codes within this five-character field. The ninth field contains a check digit. The check digit is an internally consistent number computed from the other identification numbers according to a mathematical formula. It is used during the decoding process to verify the accuracy of the other identification numbers. The next section is the Vehicle Identification Section (VIS) and contains eight characters. The first character in this section is the vehicle model year, the second character is the assembly plant name and/or location. The last six letters in this final section represent the sequential production number for a specific vehicle. To protect the confidentiality of the respondents, the sequential production number for a specific vehicle was not included on the RTECS public-use tape.

Figure A1 provides an example of a VIN and the type of data that can be obtained from decoding the VIN. (Detailed information about the VIN can be obtained from the annual editions of the *Passenger Vehicle Identification Manuals* published by the National Automobile Theft Bureau.)

Figure A1. Example of a Decoded Vehicle Identification Number

Location of the VIN

In most passenger cars the VIN is attached to the left side of the dash or instrument panel and is visible through the outside of the windshield. In some instances, the VIN is located on the inside of the door panel on the driver's side. Imported automobiles often attach the VIN to the windshield pillar post or on top of the steering column (Figure A2). Also, the VIN can be inscribed on the following documents: insurance cards, vehicle registrations, vehicle titles, safety or emission certificates, insurance policies, and bills of sale.

Figure A2. Location of the Vehicle Identification Number

Collecting the VIN

The initial collection of the VIN occurred during the RECS. Since the RECS data are collected in personal interviews, this survey would allow the interviewer to actually record the VIN from either the vehicle or a document.

The survey design allowed for the collection of the VIN during several different stages of the RTECS, thus eliminating the need to rely on a one-time effort. The VIN could be obtained during the RECS interview, the RTECS B-O-Y interview or during the E-O-Y interview. Only the RTECS households that did not provide a VIN at the time of the RECS interview, or for which the VIN was incorrectly transcribed during the RECS, were asked to provide the VIN again during the RTECS B-O-Y data collection. A household that had refused to provide a VIN at any time was not asked for the VIN a second time. RTECS precollection mailings to the households contained an explanation of the VIN and how to locate and record it.

The importance of obtaining an accurate VIN for a successful RTECS was emphasized during both the RECS and RTECS interviewer training sessions. Considerable interviewer training time was allocated to describing the VIN and providing the interviewers with thorough directions for locating and recording the VIN. The RECS interviewers were provided with examples of the VIN and with a timely article encouraging vehicle owners to inscribe the VIN on their vehicle windows as a method of providing vehicle identification in the event of theft. (*American Automobile Association World Magazine*, September/October 1990, pp. 30-31).

The Interview

The primary method of data collection for the 1991 RTECS was a telephone interview. (For the 6.5 percent of the RTECS households that could not be contacted by telephone, the VIN Cards, Odometer Reading Cards, and a postage-paid return envelope were mailed along with instructions directing the respondents to return the cards in the envelopes.) The average B-O-Y and E-O-Y telephone interviews lasted 12 minutes. The M-Y interview lasted approximately 5 minutes. Most respondents had recorded the odometer readings and VIN for each vehicle on the cards they received prior to the telephone calls.

The initial vehicle data were collected in the RECS personal interview. This interview lasted an average of 62 minutes. However, motor vehicle data were only one type of energy data collected at this time and were a small part of the respondent burden. Information about the structural features of the housing unit, the heating and cooling systems, energy fuel used, and conservation improvements were among the nonvehicle type of energy data collected.

Interviewers and Interview Training

All interviewers attended 3-hour training sessions held just prior to the B-O-Y and E-O-Y data collection and a 75-minute training session prior to the M-Y data collection. Interviewer trainers were staff members from the survey contractor who were familiar with the RTECS. The B-O-Y training sessions were observed by the EIA RTECS Survey Manager.

All interviewers were provided with a booklet of instructions. The first half of the training sessions consisted of general instructions pertaining to the RTECS forms, with a thorough explanation of the VIN and a discussion of possible trouble areas. During the second half of the training session, the interviewers were divided into three small groups. Three mock interviews were completed in each of these groups.

Immediately following each training session, the interviewers began contacting respondents. All telephone interviews were initially monitored by contractor supervisory personnel who were then able to provide instant feedback to the interviewer. Subsequent periodic monitoring occurred during each data-collection phase.

Because particular emphasis was placed on maintaining or improving B-O-Y response rate, special refusal conversion measures were undertaken for the E-O-Y collection. For example, the most experienced interviewers were used; most of the E-O-Y interviewers had worked on the B-O-Y data collection. Interviewers made an extraordinary effort and succeeded in converting households that were formerly classified as refusals at the B-O-Y or M-Y interviews to respondents at the E-O-Y interview.

Minimizing Nonresponse Bias

Nonresponse bias is one type of nonsampling error that contributes to the total error of a survey. Other nonsampling errors include population undercoverage during sampling, interviewer error, coding and/or key punching errors, and response bias. The wording and format of the survey questionnaires, the procedures used to select and train interviewers, and the quality-control procedures built into the data collection and processing operations were all designed to minimize these sources of error (See Appendix C, "Quality of the Data," for a discussion of nonsampling errors other than nonresponse bias.)

It was recognized in the early planning stages of the 1991 RTECS that special attention would have to be given to

minimizing nonresponse bias, since the RTECS households were contacted several times a year, in addition to the initial RECS personal interview. The following steps were taken to minimize the nonresponse:

- If possible, the VIN was collected during the RECS interview, thus, reducing the need to ask for the VIN during the RTECS, if it was successfully collected during the RECS
- The M-Y data collection instrument was streamlined with the primary emphasis placed on updating the vehicle stock and obtaining the odometer readings for any disposed of or acquired vehicle. The vehicle characteristics and VIN for newly acquired vehicles were collected during the E-O-Y data collection instead of during the M-Y update
- No M-Y data collection was attempted for households declared as legitimate refusals at the B-O-Y interview. All households were recontacted for the E-O-Y data collection; however, only households that previously had a valid odometer reading were asked to provide the E-O-Y odometer reading. None of the households that previously refused were asked any VIN questions
- A letter describing the survey and its importance was mailed to the households approximately one week prior to the B-O-Y and E-O-Y telephone interviews
- Most of the interviewers that had worked on the E-O-Y interview had also participated on the B-O-Y data collection
- The interviewers were requested to attempt a minimum of eight telephone calls before the household was classified as a noncontact and in many cases made up to 16 or more attempts to contact the household. (See *Housing Characteristics 1990*, DOE/EIA-0314(90), for a detailed discussion of the efforts to minimize nonresponse bias in the RECS.)

Imputations

In the instances when a RECS respondent refused to participate in one or more of the RTECS data collection phases, a decision was made to impute the missing data rather than readjust the weights to account for the RTECS nonresponse because of the availability of RECS data for these households. Missing data items were imputed using the following: RECS data files on vehicle characteristics; decoded VIN; hot- and cold-deck procedures; linear and logistic regression; predictive mean matching; and EPA data files. (See Appendix C, "Quality of the Data," for a discussion of the imputation procedures used.)

Survey Estimate Weights

All the statistics published in this report are estimates of population values, such as the total number of households in the United States. These estimates are based on a subset of the entire population of households chosen according to multistage probability sample selection rules. The universe includes all households in the 50 States and the District of Columbia, including households on military installations. Survey estimates inflate the RTECS sample results to represent the target population. This required the development of weights for each sample household using a multistage weighting procedure. The weights for the RTECS were developed from the weights that originally had been used in the 1990 RECS. These original weights were divided by the probability that a RECS household was selected into the RTECS sample. The probability that an individual 1990 RECS household was selected for the 1991

RTECS varied by the Secondary Sampling Unit (SSU) and the estimated vehicle annual mileage for the household as obtained from the RECS interview. Households were classified as a high-mileage household if the RECS estimate of the annual miles traveled of all household vehicles was 12,500 miles or more and a low-mileage household if otherwise. The RTECS selection probability or sampling rate is denoted by P, when P is defined as follows:

If the household was a high-mileage household then:

$$P = 545/(\text{Number of RECS sample households per 10 million in SSU}).$$

If the household was not a high-mileage household then:

$$P = 365/(\text{Number of RECS sample households per 10 million in SSU}).$$

If P exceeded 1.0, P was set equal to 1.0. The goal for the number of households to be sampled for RTECS was 3,000 households with 50 percent of these households considered high-mileage households. The equations for P given above were chosen with this goal in mind.

These RECS weights were appropriate for estimates of U.S. households as of November 1990 (the midpoint of the RECS data-collection time period). Since the midpoint of the RTECS data-collection period was July 1991, the RTECS weights were adjusted so that RTECS household counts were estimated at their presumed July 1991 levels. This was accomplished by use of poststratification. In poststratification, the survey weights in RTECS (and RECS) were adjusted by factors so that, within certain population subgroups, RTECS estimates of household counts would agree with those estimated from the CPS. Within each population subgroup or poststratification cell, the weight adjustment factor was computed as the CPS household count estimate divided by the RTECS household count estimate. (RTECS household count estimates are produced by summing RTECS survey weights.) The CPS estimates within the subgroups are called "control totals," and they are considered to be more reliable than the corresponding estimates from RTECS.

The poststratification cells were defined by a two-way contingency table. One margin represented metropolitan status within the Census regions. This margin had 12 categories comprised of 4 Census regions (Northeast, Midwest, South, and West) and 3 metropolitan statuses (metropolitan in center city, metropolitan outside of center city, and nonmetropolitan). The other margin of the poststratification table contained three categories (one-person-male households, one-person-female households, and all other households). Thus, the poststratification table had a total of 36 cells. However, 36 separate weight-adjustment factors were not computed. Rather, the RTECS weights within these cells were adjusted by a limited "raking" procedure. The weights were first adjusted to agree with CPS totals for the Census region by metropolitan status margin, using 12 cells. Next the weights were adjusted to CPS totals for the household type margin using 3 cells. Finally, the weights were readjusted to CPS totals for the Census region by metropolitan status margin. Raking allows for the use of more sample units in computing each weight-adjustment factor, by not distributing them around too many cells. However, the method is based on the assumption that there is no significant interaction between the margins of the poststratification table.

Data-Editing Procedures

The following steps were undertaken to ensure the accuracy of the data. Step one in the review process was to verify the accuracy of the basic identifying information. Step two consisted of manually reviewing the questionnaire for completeness and logical consistency of selected patterns of response and to prepare the questionnaires for translation into machine-readable form. In the third step, the data were keyed into machine-readable format. Any inconsistencies in the skip patterns were automatically noted and resolved by one of the editors. In the fourth step, the keypunching

of all data was verified. During the fifth step, the data were machine edited to further ensure completeness, logical consistency, and the legitimacy of coded values.

Comparisons were made of the vehicle characteristics provided by the respondent and the vehicle characteristics obtained from the VIN. When a discrepancy occurred the vehicle characteristics obtained from the VIN were usually used.

Report Preparation Procedures

Prior to a final data tape, a preliminary data tape was delivered to the EIA in August 1992. EIA data analysts reviewed and processed the data to prepare it for the final data tape. Crosstabulations were run, checked for internal consistency, and compared with data from previous RTECS. Generally, inconsistencies were resolved by the survey contractor. As a quality control measure, selected tabulations were produced using two different software programs, Table Producing Language (TPL) and Statistical Analysis System (SAS).

A final clean edited data tape of household vehicle survey data was delivered to the EIA in September of 1992. After the edited data tape was provided by the survey contractor, EIA data analysts further reviewed and processed the data to prepare it for release in the statistical reports. Statistical tables of aggregated data were produced and analyzed. The report text is based on these tables.

Confidentiality of Information and Public-Use Tape Preparation

The EIA does not receive or take possession of the names or addresses of individual RTECS respondents or any other individually identifiable energy data that could be linked with information describing the household. All such identifiable information is maintained by the survey contractor.

Following the publication of the statistical report for the RTECS and the statistical reports for the RECS, a final data tape is prepared for release to the public. This tape contains both the housing characteristics and energy supplier data for the RECS and the vehicle data for the RTECS. Additional measures such as the stripping of all geographic identifiers except Census region and Census division, are taken at this time to further mask the data and to ensure that the identity of the individual respondent is kept confidential. At the culmination of these procedures, a final data tape is released to the public through the National Technical Information Service (NTIS). (See Appendix G, "Related EIA Publications on Energy Consumption," for information on how to order these tapes.)