OCS Study
MMS 87-0041

Analysis of Indicators for Socioeconomic Impacts Due to OCS Oil and Gas Activities in the Gulf of Mexico Year II

Volume II

MMS U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Regional Office

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Volume II

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I. Introduction

The socioeconomic assessment program developed for the Minerals Management Service (MMS) of the U.S. Department of the Interior to calculate Outer Continental Shelf (OCS) oil and gas related impacts for economic areas along the Gulf of Mexico (GOM) is called the Socio-economic Assessment Model (SAM). SAM is based on the needs and requirements of MMS. These needs and requirements include 1) exclusive use of nonsurvey information; 2) industry detail at the three- and four-digit Standard Industrial Classification (SIC) level; 3) socioeconomic assessments at the multicounty/parish level (the coastal county/parish descriptions of the Coastal Areas are indicated in Figure One); 4) assessment measures that include industry output, income, employment, and population; 5) full editing and information updating capabilities; and 6) full use on the MMS Perkin-Elmer 3500 computer system. See Volume I of the Final Report for an extended discussion of MMS objectives and conditions.

To meet MMS needs and requirements, a nonsurvey regional input-output model (I/O) was selected as the basic analytical structure for SAM. In brief, SAM contains four components or modules, as indicated in Figure Two. The SAM program with documentation for the MMS Perkin-Elmer 3500 system is given in Appendix A. The input-output component generates industry output, income, and employment effects for the MMS Coastal Areas. To estimate population effects at the MMS Coastal Area level, the I/O component is linked with a Demographic component. A Data Base component and an Output component complete the SAM system (see Figure Two).

The following section, called Structure, explains the four basic components of SAM shown in Figure Two. Since I/O analysis provides the basic analytical structure for SAM, this section begins with the formulation and development of the Input-Output component. This is followed by a discussion of how the Demographic and Input-Output components are linked. Next, the discussion turns to the Data Base component and the various data files that comprise this component. As Figure Two indicates, the Data Base component is the first building block of SAM. However, to understand the data requirements of SAM, it is necessary to explain first the analytical parts of SAM, which are the Input-Output and Demographic components. Attention is then turned to the last component--Output. The Output component will be explained at greater length in the operational section of this manual, called Operations.

The section entitled Operations is devoted to instructions on program operations. SAM contains a variety of commands that permit the analyst to carry out not only the development of nonsurvey regional input-output models, linked with demographic parameters, but also to use these models to conduct various kinds of socioeconomic assessments for local area economies. As the analyst will discover, one very important command available in SAM is the macro command. This command permits the

user to string together any number of individual commands to perform routine operations. A number of macros have been prepared with the analyst in mind, and therefore, the Operations section focuses on the use of these macros for conducting socioeconomic impact assessments.

A final section, called Commands, explains each of the commands and options available in SAM. This section provides the user with a quick reference guide.

The Appendix contains SIC definitions, input-output sector definitions, and software documentation.

II. Structure

II.A. The Input-Output Component

The basic analytical structure of SAM is an input-output model or, more specifically, a nonsurvey regional input-output model. Therefore, a review of input-output analysis is provided here. It should be noted, however, that this review is inadequate for analysts who have only a limited understanding of input-output analysis. A recommended text in input-output analysis is Input-Output Analysis: Foundations and Extensions, by Ronald E. Miller and Peter D. Blair.

II.A.1. General Input-Output Analysis

Input-output analysis, a name given to interindustry analysis by Wassily Leontief in the late 1930s is based upon the identification and measurement of the various economic interdependencies of the producing and consuming units within an economy. In 1973, Professor Leontief received the Nobel Prize in Economic Science for his pioneering work in input-output analysis.

To the nonspecialist, an input-output (I/O) model may appear as simply several very large tables that contain a great amount of data. This description, while basically accurate as to the visual characterization of the model, fails to note how these numbers represent transactions among economic units (sectors), indicating flows of goods, services, and money. In brief, an I/O model (i.e., the input-output tables) indicates where different industries, governments, and consumers purchase goods and services and where producers, in turn, sell their goods and services.

The usual set of tables that make-up an I/O model are (1) the transactions table, (2) the direct requirements table, and (3) the total requirements table.

FIGURE ONE

MMS COASTAL AREAS, BY COUNTY/PARISH

Coastal Area		Counties/Parishes
E1	Florida:	Bay, Escambia, Okaloosa, Santa Rosa, Walton
E2	Florida:	Dixie, Franklin, Gulf, Jefferson, Levy, Taylor, Wakulla
E3	Florida:	Charlotte, Citrus, Collier, De Sota, Hernando, Hillsborough, Lee, Manatee, Pasco, Pinellas, Sarasota
E4	Florida:	Dade, Monroe
C1	Louisiana:	Calcasieu, Cameron, Iberia, Lafayette, Vermilion
C2	Louisiana:	Ascension, East Baton Rouge, Lafouche, Livingston,m St. Charles, St. James. St. John the Baptist, St. Mary, Terrebonne, West Baton Rouge
C3	Louisiana:	Jefferson, Orleans, Plaquemines, St. Bernard, St. Tammany
C4	Mississippi and Alabama:	Hancock, Harrison, Jackson, Stone, Baldwin, Mobile
W1	Texas:	Aransas, Calhoun, Cameron, Jackson, Kenedy, Kleberg, Nueces, Refugio, San Patricio, Victoria, Willacy
W2	Texas:	Brazoria, Chambers, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Matagorda, Montgomery, Orange, Waller

Source: Minerals Management Service

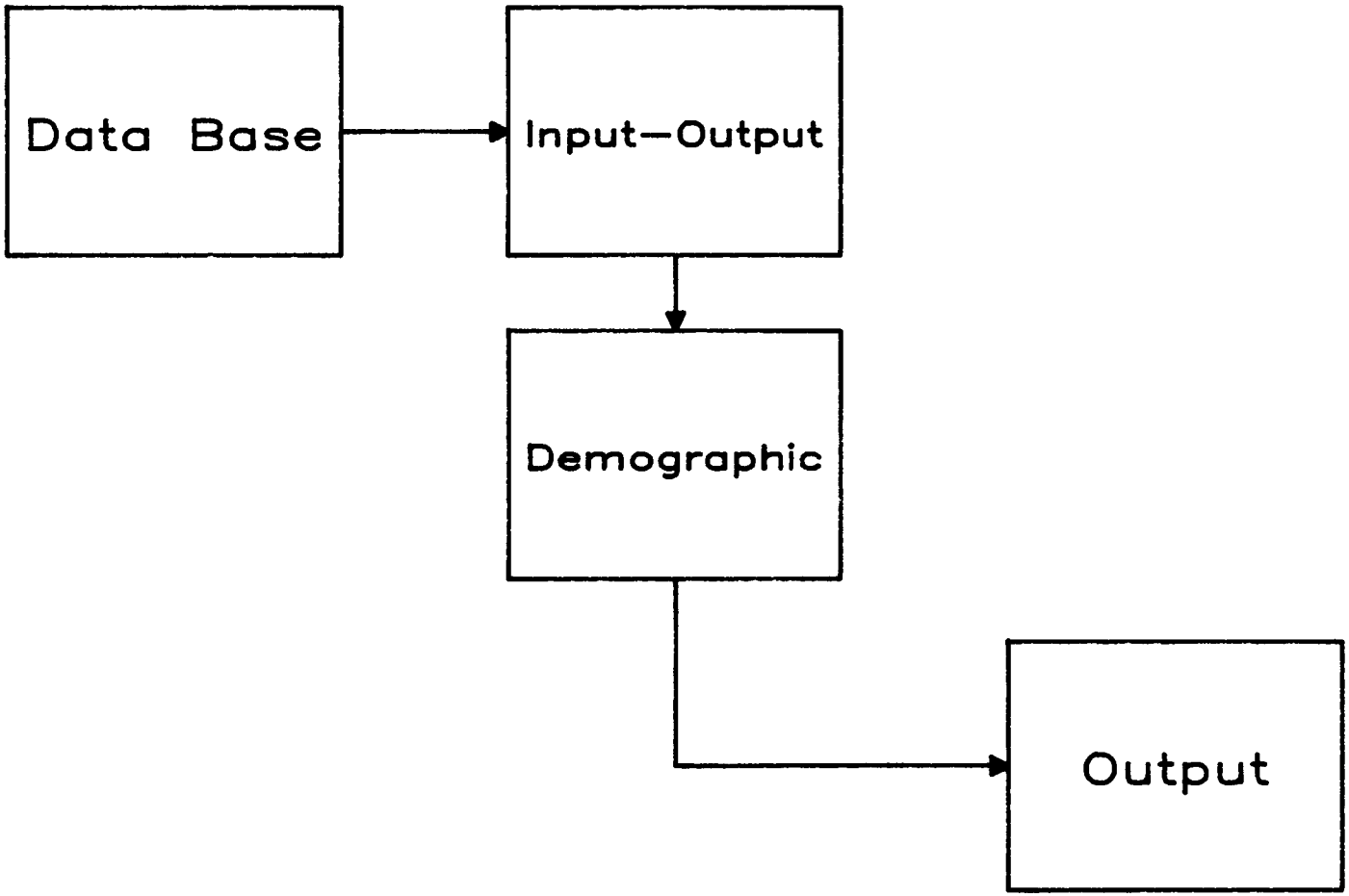
The transactions table is a system of economic accounts, similar to business accounts with certain accounting principles and rules. Its single most important feature is the systematic classification of interindustry transactions. In brief, a transactions table is a descriptive picture of the various transactions among industries in an economy for some specified accounting period. The interindustry accounting framework of the I/O transactions table incorporates an important "double counting" feature, where the producing sectors' outputs are recorded as sales to intermediate and final demand sectors and, also, as purchases by the same intermediate and final demand sectors; hence, the name input-output analysis. With I/O analysis, the internal markets of the economy are brought into view, which is important for assessing economic impacts. As it will be shown later, the formulation of nonsurvey regional I/O models does not require the construction of the transactions table.

The direct requirements table is derived from the transactions table, or in the case of nonsurvey I/O models, the direct requirements table is typically developed from national Use and Make information. On the basis of a transactions table, the derivation of the direct requirements table involves dividing each producing sector's purchases, which are identified by reading down the sector column of the transactions table, by its total gross outlay (or sector output), which is that sector column sum. The derivation of a direct requirements table from national Use and Make tables will be explained later. What is important here is interpretation. The input coefficients of a direct requirements table represent, on average, the various inputs required to produce one dollar of output by the producing sector. Average relationships are assumed whenever an I/O model is used to measure total economic effects. Moreover, the direct requirements coefficients of a regional input-output model are trade coefficients rather than technical input coefficients. Technical input coefficients indicate the total amount of a particular input that is required to produce one dollar of sector (or industry) output. Regional input coefficients are adjusted for trade, meaning that these coefficients reflect only those inputs being supplied by producers located within the region.

The total requirements table (or, the so-called Leontief inverse) is derived from the direct requirements table. This table provides the economic information for the computation of sector (or industry) specific multipliers, which can be measured in terms of output, employment, or income. These multipliers make it possible to calculate socioeconomic impacts.

Several key assumptions are involved in the derivation and interpretation of an I/O model. The validity of these assumptions needs to be carefully considered when applying I/O analysis to regional economies. First, it is important to understand that, as noted earlier, the direct requirement coefficients or input coefficients are average relationships. Next, the I/O model assumes that the relationship between input and output is proportional. Therefore, if the quantity of each input is doubled, the producing sector's output is also doubled. Finally, it is assumed that there is no substitution of production inputs. As noted earlier, regional input coefficients are not the same

Figure Two
The SAM Model



as technical input coefficients. Because of the substantial amount of trade with other regions, regional input coefficients are, in fact, trade coefficients. That is, for any column in the direct requirements table, each input coefficient shows only the amount of that input the producing sector purchased from the region in order to produce one dollar of output. An additional amount of the same type of input may have been purchased from outside the region. The amount of a particular input purchased from producers located in the region plus any additional amount of the same type of input purchased from sources outside the region per dollar of output is the technical input coefficient for that input. But the assumption of "no substitution" means that regional input sources are not substitutable for "outside" input sources, and vice versa, which may not be a reasonable assumption for small area economies. Generally speaking, a small area, for example a county, is likely to show a greater variation in its trade patterns over time than will a multistate region.

It is most likely that the above assumptions are violated, at least to some degree, in input-output application, particularly for small area economies. Turning to the matter of constant technology, Miller and Blair in Input-Output Analysis: Foundations and Extensions provide specific reasons as to why technology may not remain fixed in an input-output framework.

1. There is a technological change itself, whereby new techniques of production are introduced in a sector (e.g., replacement of some human labor with capital to carry out production).

2. If there is a large increase in demand for the products of a particular sector, output will increase (subject, of course, to capacity constraints), and the producer may experience economies of scale. (Conventional input-output analysis does not allow for economies of scale in production.)

3. New products are invented (e.g., plastics) which means that (a) there may be an entirely new sector--row and column--in a sufficiently disaggregated table or at least the product mix will change in an existing sector if the new product is classified there, and/or (b) it may be used to replace an older product as an input to production in other sectors (e.g., plastic bottles rather than glass for soft drinks).

The assumptions of proportional input-output relationships, average input coefficients, and no substitution of production factors can be reduced to a single basic assumption of fixed factor proportions for a final comment concerning the validity of regional input coefficients.

The validity of the more general assumption of fixed factor proportions is related to the degree of industry aggregation used in the

definitions of the I/O sectors. Industry aggregation, as used here, refers to the grouping of producing units; for example, establishments, into producing sectors. At one extreme, complete aggregation of all producing units would result in an I/O model with only one producing sector. Such an I/O model would not show interindustry transactions and, hence, interindustry relations. At the other extreme, each producing unit of the region would be shown in an I/O model as a separate producing sector. The number of sectors in the model would equal the number of producing units in the region. It is true that this detailed I/O model would give a complete picture of interindustry relations, but it would produce confusion by its sheer complexity. Obviously, neither extreme is used in the construction of an I/O model. Therefore, the first step in model construction is to determine the degree of aggregation which will make the best use of obtainable statistical information, on the one hand, and render validity to the assumption of fixed factor proportions on the other. While the availability and quality of data, along with industry aggregation, affect the accuracy of the results, it is the intent here to concentrate on the association between the validity of the assumptions and the degree of industry aggregation. To this end, the discussion will focus on the major conditions that need to be satisfied to render validity to the basic assumption of fixed factor proportions.

One condition is that the substitution of one input factor for another must be negligible. A very fine classification of industry groups (sectors) may result in closely substitutable produced inputs being put into different sectors. If input substitution occurs, because of, say, a price change, the interindustry relations after the substitution would differ from the industry relations before the price change. This possibility can be largely avoided by classifying closely substitutable inputs in the same sector.

A second condition is that no significant excess capacity exists in the industry group (sector). This is an important condition because with excess capacity or very large inventories of some inputs it may be possible for output to be increased without proportional increases in these inputs. A larger degree of industry aggregation would mean that excess stocks of inputs by some establishments would tend to be canceled out by depleted stocks of other establishments.

A problem similar, but not identical, to excess stocks is input indivisibilities. An indivisible input is one where a unit of input suffices over a range of output, thus disproving the fixed factor proportions assumption. Sufficient industry aggregation will minimize this problem as some establishments in the industry group (sector) will purchase indivisible inputs to expand production while others will be able to expand output without an increase in such inputs. Thus the average input requirements for the industry group will tend to be more proportional to the increase in output if a large number of establishments are in the same industry group.

A fourth condition, changes in technology, must not occur. Obviously, this is an unrealistic condition, but again the broader the

industry classification, the more likely it is that the effects of different technologies will cancel out.

The fifth condition is that constant returns to scale exist for the industry group (sector). This is a realistic condition because aggregation will tend to average out internal differences of economies of scale. Within the industry group (sector), some establishments may be enjoying internal economies of scale; that is, lower average production costs with higher levels of output. The assumption of fixed factor proportions is not valid in this case. But other producers of the same sector may be experiencing internal diseconomies of sale; that is, higher average production costs with higher levels of output. An aggregation of establishments with reversed average cost schedules would tend to cause a cancellation; and hence, the average cost schedule for the industry group (sector) would approximate the fixed input-output relationship that is assumed in I/O analysis.

In summary, I/O models are built upon a number of important assumptions that have been noted here. These assumptions must be taken into consideration when interpreting I/O results. All in all, however, I/O analysis provides meaningful and useful assessments of socioeconomic conditions even though these assessments represent only a surrogate of actual socioeconomic conditions for the study period.

II.A.2. The MMS I/O Sectors

Basic to the construction of I/O models for the MMS Coastal Areas was the accounting of all economic activity as sectors. (The terms sector and industry are used interchangeably in this manual.) One hundred and sixteen (116) sectors were used to classify regional economic activity for the MMS Coastal Areas. Briefly, the formulation of the 116 sectors features the Coastal Areas' businesses that are most linked to OCS oil and gas activity in the Gulf of Mexico. These 116 sectors, listed in Table 1, represent an aggregation of the 537 industries and commodities named in the 1977 National Use and Make tables of the Bureau of Economic Analysis of the U.S. Department of Commerce. The directory for the national industries and commodities is given in Appendix B. The aggregation directory that matches the 537 national industries and commodities with the 116 sectors for the MMS study is given in Appendix C.

As noted earlier, nonsurvey based regional input-output models for U.S. regions are typically based on national input-output coefficients. These input-output coefficients are derived from national Use and Make information. Techniques are then employed to adjust these national coefficients to reflect the region's production input relationships. The primary data sources used in the MMS project, which will be discussed in more detail later, were 1) the 1977 national Use and Make tables at the 537 industry/commodity level; 2) County Business Patterns employment and payroll information, published by the U.S. Department of Commerce, Bureau of the Census; and 3) producer and consumer price index information, published by the U.S. Department of Labor, Bureau of Labor Statistics. Other data sources, such as the 1982 Census of Agriculture,

TABLE 1

MMS I/O SECTORS

1.	Livestock & Livestock Products
2.	Other Agricultural Products
3.	Forestry Products**
4.	Commercial Fishing**
5.	Agricultural, Forestry, & Fishery Services**
6.	Iron & Ferroally Ores Mining**
7.	Nonferrous Metal Ores Mining, Except Copper**
8.	Coal Mining**
9.	Crude Petroleum & Natural Gas*
10.	Dimension, Crushed & Broken Stone Mining and Quarrying**
11.	Other Stone & Clay Mining and Quarrying
12.	Chemical & Fertilizer Mineral Mining
13.	New Petroleum Pipelines
14.	New Petroleum & Natural Gas Well Drilling*
15.	New Petroleum, Natural Gas, & Solid Mineral Exploration*
16.	Other New Construction
17.	Maintenance & Repair of Gas Utility Facilities*
18.	Maintenance & Repair Of Petroleum Pipelines*
19.	Maintenance & Repair of Petroleum & Natural Gas Wells*
20.	Other Maintenance & Repair Construction
21.	Ordnance & Accessories
22.	Canned & Cured Sea Food**
23.	Fresh & Frozen Packaged Fish**
24.	Other Food & Kindred Products
25.	Tobacco Manufacturers
26.	Textiles & Apparels
27.	Logging Camps & Logging Contractors**
28.	Sawmills & planing Mills, Generals
29.	Other Lumber & Wood Products
30.	Furniture & Fixtures
31.	Paper & Allied Products, Except Containers
32.	Paperboard Containers & Boxes**
33.	Printing and Publishing
34.	Industrial Inorganic & Organic Chemicals**
35.	Other Chemicals & Selected Chemical Products
36.	Plastics & Synthetic Materials

TABLE 1

MMS I/O SECTORS
(continued)

37.	Drugs, Cleaning & Toilet Preparations
38.	Paints & Allied Products**
39.	Petroleum Refining*
40.	Petroleum Products
41.	Rubber & Misc. Plastics Products
42.	Leather, Footwear & Other Leather Products
43.	Glass & Glass Products
44.	Ready-mix Concrete**
45.	Other Stone & Clay Products
46.	Blast Furnaces & Steel Mills**
47.	Electrometallurgical Products**
48.	Steel Pipes & Tubes**
49.	Iron & Steel Foundries**
50.	Other Primary Iron & Steel Manufacturing
51.	Aluminum Rolling & Drawing**
52.	Nonferrous Wire Drawing & Insulating**
53.	Other Primary Nonferrous Metals Manufacturing
54.	Metal Containers
55.	Fabricated Structural Steel**
56.	Fabricated Plate Work (Boiler Shops)**
57.	Sheet Metal Work**
58.	Other Heating, Plumbing & Fabricated Structural Metal Products
59.	Screw Machine Products & Bolts, Nuts, Rivets, & Washers**
60.	Other Screw Machine Products and Stampings
61.	Metal Coating & Allied Services**
62.	Misc. Fabricated Wire Products**
63.	Pipe, Valves, & Pipe Fittings**
64.	Other Fabricated Metal Products
65.	Engines & Turbines
66.	Farm & Garden Machinery
67.	Oil Field Machinery**
68.	Construction & Mining Machinery, Except Oil Field Machinery
69.	Materials Handling Machinery & Equipment
70.	Metalworking Machinery & Equipment
71.	Special Industry Machinery & Equipment
72.	General Industrial Machinery & Equipment
73.	Miscellaneous Machinery, Except Electrical
74.	Office, Computing, & Accounting Machines
75.	Service Industry Machines
76.	Electrical Industrial Equipment & Apparatus
77.	Household Appliances
78.	Electric Lighting & Wiring Equipment
79.	Radio, TV, & Communication Equipment
80.	Electronic Components & Accessories

TABLE 1

MMS I/O SECTORS
(continued)

81.	Miscellaneous Electrical Machinery & Supplies
82.	Ship Building & Repairing**
83.	Other Transportation Equipment
84.	Scientific, Photographic & Medical Equipment
85.	Miscellaneous Manufacturing
86.	Railroads & Related Services**
87.	Motor Freight Transportation & Warehousing**
88.	Water Transportation**
89.	Pipelines, Except Natural Gas**
90.	Other Transportation & Warehousing
91.	Communications, Except Radio & TV**
92.	Radio & TV Broadcasting
93.	Electric Services (Utilities)**
94.	Gas Production & Distribution (Utilities)**
95.	Gas, Water, & Sanitary Services
96.	Wholesale Trade**
97.	Retail Trade**
98.	Banking**
99.	Insurance Carriers**
100.	Other Finance & Insurance
101.	Real Estate & Rental
102.	Hotels & Lodging Places**
103.	Personal & Repair Services, Except Auto
104.	Miscellaneous Repair Shops**
105.	Computer & Data Processing Services**
106.	Management, Consulting, Testing, & Research Lab. Services**
107.	Equipment Rental & Leasing Services**
108.	Advertising**
109.	Legal Services**
110.	Accounting, Auditing & Bookkeeping & Miscellaneous Services**
111.	Other Business Services
112.	Eating & Drinking Places**
113.	Automotive Repair & Services
114.	Amusements
115.	Health, Educational, & Social Services & Nonprofit Organizations
116.	Other Industry

Source: Resource Economics and Management Analysis, Inc., Analysis of indicators for socioeconomic impacts due to OCS oil and gas activities in the Gulf of Mexico, year II, Information collection log - II.A., 1986.

Note: Industries that are marked with one asterisk are Primary Industries; industries marked with two asterisks indicate a Supportive Industry.

were used to complete the data requirements. Each data source will be discussed later in the section entitled The Data Base Component (Section II.C.).

The construction of the nonsurvey regional input-output models for the ten MMS Coastal Areas essentially involved the following six steps.

1. The price updating of the 1977 national Use table to reflect 1984 relative prices--(the national Make table does not need to be price updated, when an industry-based technology assumption is followed in the derivation of an industry-by-industry input-output model);

2. The removal of competitive imports from the national Use table;

3. The adjustment for industry mix on the basis of the particular industry composition of each of the MMS Coastal Areas--(this adjustment procedure is necessary for the derivation of the weighted average input coefficients for the 116 MMS sectors, which are aggregates of the 537 industries represented in the national tables.);

4. The final derivation of sector-by-sector input-output models for each of the ten Coastal Areas--(the derivation of the regional I/O models was based on the assumption of industry-based technology);

5. The regionalization of the sector-by-sector relationships to reflect regional input relationships. (the simple location quotient technique was used to regionalize the input relations.); and

6. The inclusion of three household rows and, correspondingly three household columns to account for the three labor classes identified in the MMS Coastal Areas; that is, resident, commuter, and relocator.

The above six steps that were used in the construction of the I/O models for the MMS Coastal Areas should be clearly understood by the analyst prior to operating SAM. To this end, each step is developed below.

STEP ONE: For the MMS Study, Step One involved the updating of the 1977 Use table to reflect 1984 price relationships. 1984 price information was used since the MMS study called for current price relationships for the 1981-84 study period. The price updating procedure was carried out in the following way.

First, a brief interpretation of a Use table is in order. Basically, a Use table shows the value of each commodity (i.e., materials and services) used by each industry. Row entries in the table, excluding the value added rows, represent the use of commodities

by industrial and final demand users. Column entries, in turn, represent the value of commodities used and the value added in production by the industry named at the head of the column. Columns represent industry and final demand sectors. Rows represent commodity and value added categories.

A price index file, named GULFPRIC.DAT, was developed that contains price adjustment indices for the 537 commodities and services categories used in the 1977 national Use table plus two additional indices for primary payments, called the Employee Compensation sector and the Other Primary Payments sector. This file was developed on the basis of published price index information for the years 1977 and 1984. Information for this file is given in Appendix D.

For discussion purposes, Table 2 provides a 23-sector aggregation of the 537 commodity/industry national Use table, and similarly, Table 3 provides a 23-sector aggregation of the 537 commodity/industry level national Make table. These aggregated national Use and Make tables simplify the discussion of how the more detailed national tables were used to generate the I/O models for the ten Coastal Areas. The sector descriptions for Tables 2 and 3 are given in Figure Three. The commodity/industry descriptions for the 537-level national Make and Use tables are given in Appendix B.

For the Use table, two primary payments sectors, Employee Compensation and Other Primary Payments, have been included along with the commodity/industry sectors (Table 2) so that each sector column of the Use table sums to total gross sector outlay (output). Column sums (i.e., sector outlay values) are used to convert sector purchases to sector input coefficients. The Employee Compensation sector of primary payments is separated from Other Primary Payments so that the so-called "induced-by" effects of household expenditures can be included in the estimates of total socioeconomic impacts of GOM/OCS oil and gas activities. Including employee compensation effects as part of total economic impact is particularly important in the MMS study since employment in the OCS oil and gas activities involves three important labor sources: local, commuter, and relocator. For I/O analysis and impact assessment purposes, the inclusion of an Employment Compensation row sector in the Use table also requires the addition of a corresponding column sector, called here the Employee Expenditures sector. Entries in the Employee Expenditures sector represent employee expenditures for goods and services (or personal consumption).

The price adjustment indices for the 25 sectors of Table 2 are given in Table 4. The price indices recorded in Table 4 were derived from the more detailed prices indices given in Appendix D. The various data sources for the 1977 and 1984 price indices of Appendix D are indicated in the Table's footnotes. The most important data source was the Producer Price Index series that is published regularly by the U.S. Department of Labor. Producer price indices are used in input-output analysis, since commodity/service purchases by industries should be valued in terms of producer (i.e., f.o.b.) prices. Producer price index information by commodity type is published regularly by the U.S. Department of Labor. Unfortunately, the commodity classification system

TABLE 2

TWENTY-THREE SECTOR U.S USE TABLE

	Ag	Metal Mining	Petro Mining	Other Mining	Constr	Food & Feed	Textil Prod	Wood & Furnit	Paper Print	Chem	Petro Prod	Rubber Plast	Stone Clay	Metals	Non-elc Mach	Elect Equip	Transp Equip	Other Manuf	Transp Trade	Utilit	Other Servic	Gov't Enterp	Scrap	Emp Exp
Agriculture	31868	0	2	6	658	55692	2334	3802	22	400	0	0	4	3	1	2	2	27	643	7	4471	163	0	11378
Metal Mining	0	470	0	0	0	0	0	0	3	652	0	0	13	5655	0	10	0	1	0	0	0	0	0	0
Petro Mining	0	0	2302	0	0	0	0	0	0	1819	60050	53	0	27	0	0	0	0	79	13148	0	0	0	0
Other Mining	163	32	0	2757	2044	117	40	10	334	1667	227	49	1984	3498	30	16	54	34	4	6065	22	1202	0	237
Construction	1383	35	2718	170	304	883	355	320	678	876	818	263	502	2365	535	417	497	197	7182	3712	28346	4971	0	0
Food & Feed	11358	1	5	1	10	35854	22	36	248	1184	35	540	21	21	17	11	9	71	399	5	27483	491	0	121944
Textile Prod	283	1	11	41	1435	73	32587	1146	776	141	20	2023	130	92	114	84	3059	706	399	4	2066	77	0	40189
Wood & Furn	196	29	0	71	18901	83	15	13894	2691	67	23	144	287	484	203	508	1419	465	450	59	180	0	0	9756
Paper&Print	302	2	16	51	836	6939	808	394	26482	2503	501	1089	921	1000	686	1081	392	1360	4843	112	10373	305	0	15736
Chemicals	7735	168	410	349	3575	2131	8629	939	3770	31139	3361	9809	1292	4397	556	1654	1227	2048	305	321	7239	268	0	18238
Petroleum	3554	116	259	547	7218	773	463	520	1509	2254	7754	527	633	1608	572	322	562	284	13851	8099	4829	1061	0	38595
Rubber&Plast	664	88	22	198	3024	2062	1176	1042	1253	1878	150	3687	193	1292	1977	2842	5540	1516	2116	61	3269	75	0	14054
Stone&Clay	75	23	18	80	16376	3034	123	365	95	663	197	355	4123	1078	708	1090	1827	306	243	9	1298	64	0	1952
Prim&Fab Met	291	276	757	550	33183	6836	75	3353	640	3512	595	956	728	60695	19490	10988	29249	3675	1289	156	3871	65	0	3269
Equip ex.Ele	946	313	698	1560	5414	310	458	365	593	1003	167	338	392	4217	17099	1290	6769	392	1350	701	3618	255	0	1577
Elec equip	408	25	270	133	7233	17	49	73	22	35	7	56	56	1012	5236	12964	6857	1539	637	201	4803	295	0	19283
Trans equip	292	46	5	48	132	8	5	50	15	7	102	28	82	82	589	56	38621	13	2414	28	5733	150	0	54244
Trans&trade	24	12	36	27	1234	55	638	51	628	142	27	128	69	248	354	532	714	2195	987	130	5532	95	0	16990
Other Manuf	7514	277	578	877	29238	14941	4421	3941	7602	8352	4851	2708	3235	14176	7322	5743	8677	3050	30999	3163	24170	2289	0	255760
Utilities	1623	397	750	797	834	2108	1147	702	2116	4543	2378	875	1765	5756	1141	963	1333	399	8494	21426	12628	3548	0	41824
Other Servic	11924	372	6214	1710	20877	13013	4308	2683	8224	10802	3244	3085	2052	7590	6347	6612	7686	4425	85435	3064	158907	2912	0	22738
Gov't Enterp	59	13	19	28	166	376	266	85	956	195	99	107	63	242	192	236	277	138	2187	332	5562	366	0	6268
Scrap	0	15	0	35	29	0	78	0	508	40	0	3	43	3551	104	55	217	0	48	0	224	1	0	0
Emp Comp	11619	1775	3570	7447	90372	26490	21679	14070	28442	20866	5205	13083	10506	49618	38350	31523	44749	13794	211595	11999	277307	21679	0	5930
Other Paymnt	37382	870	30423	6109	21241	30258	7561	7830	13937	17743	9084	7116	5519	19678	17042	10021	14844	8179	134690	32794	382306	206180	0	552449
Totals		129663	5356	49083	23592	264334	202053	87237	55671	101544	112483	98895	47022	34613	188385	118665	89020	174581	44814	510639	105596	974237		

Source : Miller, R.E. and Blair, P.D., 1985. Input-output analysis: foundations and extentions. [Englewood Cliffs, NJ]: Prentice-Hall, Inc., pp. 428-429.

TABLE 3

TWENTY-THREE SECTOR U.S. MAKE TABLE

	Ag	Metal Mining	Petro Mining	Other Mining	Constr	Food & Feed	Textil Prod	Wood & Furnit	Paper Print	Chem	Petro Prod	Rubber Plast	Stone Clay	Metals	Non-elc Mach	Elect Equip	Transp Equip	Other Manuf	Transp Trade	Utilit	Other Servic	Gov't Enterp	Scrap	Emp Exp
Agriculture	125829	0	0	0	0	3617	0	102	0	0	0	0	0	0	0	0	0	0	15	0	100	0	0	0
Metal Mining	0	5344	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petro Mining	0	4	43385	2	0	0	0	0	0	62	3264	0	8	0	52	0	0	0	0	2307	0	0	0	0
Other Mining	0	11	1	22550	0	0	0	0	0	823	31	0	174	0	0	0	0	0	0	0	0	0	0	0
Construction	0	0	0	0	264334	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food & Feed	9	0	0	0	0	201365	10	5	57	402	0	60	0	76	22	3	0	15	0	0	1	0	27	0
Textile Prod	0	0	0	0	0	4	85177	99	163	1281	6	177	53	25	43	8	8	137	0	0	1	0	54	0
Wood & Furn	0	0	0	0	0	0	49	54752	82	76	3	87	82	210	75	79	45	105	0	0	3	0	23	0
Paper&Print	0	0	0	0	0	20	159	96	81189	243	3	437	28	273	204	145	7	346	0	0	18136	0	259	0
Chemicals	0	0	50	141	0	615	429	7	148	108075	1200	572	130	159	182	164	13	531	0	0	1	0	65	0
Petroleum	0	0	0	44	0	0	5	1	16	7135	91504	18	112	40	10	0	0	2	0	0	0	0	9	0
Rubber&Plast	0	0	0	2	0	30	235	72	128	528	4	45134	99	214	243	74	120	139	0	0	1	0	0	0
Stone&Clay	0	0	0	201	0	0	25	34	69	153	55	88	33680	80	77	72	30	48	0	0	1	0	0	0
Prim&Fab Met	0	0	0	3	0	8	38	180	406	709	2	283	204	181938	1817	679	770	295	0	44	4	0	1005	0
Equip ex.Ele	0	0	0	0	0	9	27	91	87	236	1	150	41	1955	112302	1612	1549	453	0	0	3	0	151	0
Elec equip	0	0	0	0	0	0	38	74	55	106	0	119	63	1063	1796	84017	980	490	0	0	2	0	216	0
Trans equip	0	0	0	0	0	0	51	110	50	26	10	72	58	1847	1979	1149	168658	246	0	0	0	0	323	0
Trans&trade	0	0	0	0	0	9	68	80	128	456	1	232	69	276	334	623	137	41560	0	0	793	0	49	0
Other Manuf	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	509271	1264	2	0	68	0
Utilities	0	0	86	0	0	0	0	0	0	143	30	0	0	0	0	0	0	0	0	105282	0	54	0	0
Other Servic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	974237	0	0	0
Gov't Enterp	0	0	0	0	0	0	0	0	0	41	0	0	25	0	0	0	0	0	5150	13559	4656	223081	0	0
Scrap	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emp Comp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Totals	125872	5359	43522	22955	264334	205677	86311	55703	82578	120495	96114	47429	34826	188156	119136	88625	172317	44367	514436	122456	997941	223135	2249	1

Source : Miller, R.E. and Blair, P.D., 1985, Input-output analysis: foundations and extentions. [Englewood Cliffs, NJ]: Prentice-Hall, Inc., pp. 430-431.

used by the U.S. Department of Labor does not match exactly the commodity classifications used in the national Use table. This means that judgment must be exercised to match the Department of Labor's price indices with the commodity categories used in the national Use table. An added issue is the fact that the U.S. Department of Labor series includes only commodities. Therefore, the Consumer Price Index series must be used to develop price indices for the trade and service categories in the national Use table. Again, judgment must be exercised when matching the commodity/service descriptions of the Use table with appropriate consumer price indices. Finally, the price indices for the construction sectors of Appendix D were obtained from a special report by the International Trade Association of the U.S. Department of Labor in a publication entitled Construction Review.

Once appropriate price indices have been determined for all the categories in the Use table (e.g., columns two and three of Table 4) the price adjustment indices can be calculated, which is column four of Table 4. Price adjustment indices are simply ratios of current year indices to corresponding base year indices. (These ratios can be computed quite easily with the use of a micro spreadsheet program, such as LOTUS 123.) Once the price adjustment indices have been calculated they need to be transferred to the GULFPRIC.DAT file of SAM, using the GET command of SAM. The operation of the GET command is explained in a later section entitled Commands. It should be pointed out that the MATH and BUILD commands available in SAM provide an alternative way for constructing the GULFPRIC.DAT file. The MATH and BUILD commands are also explained in the Commands section.

Each element of the price adjustment index file is multiplied times the corresponding row elements of the national Use table, resulting in a price updated national Use table (Table 5). Realize that the only difference between Tables 2 and 5 is relative prices. Table 2 records sector purchases of commodities/services in terms of 1977 prices. Table 5, on the other hand, shows sector purchases in terms of 1984 prices. It is important to understand that price updating does not alter technical requirements. What is being assumed here is that there has been no change in sector production technologies between 1977 and 1984.

It is not necessary to price update the national Make table. This can be seen quite easily. The Make table is constructed so that columns represent commodities and rows identify the industries that produced and supplied these commodities. Thus, column entries show the amounts (or proportions) that different industries produced/supplied of the column commodity. To divide a column element by the corresponding column sum, which represents the total production of the column commodity j, determines the fraction of total production of commodity j in the economy produced by industry i. To price update these column entries would not change the industry proportions.

The price updated transactions of the national Use table are next converted to sector input coefficients, defined as bij coefficients. The bij coefficients are derived by dividing sector column entries by the respective column sum, where the column sum is the price (value) updated estimate of industry output. The bij coefficients are defined

FIGURE THREE

SECTOR TITLES FOR THE 25-SECTOR
NATIONAL USE AND MAKE TABLES

Sector Number	Sector Description
1.	Agriculture, Forestry, & Fishing
2.	Metal Mining
3.	Petroleum & Natural Gas Mining
4.	Other Mining
5.	Construction
6.	Food, Feed, & Tobacco Products
7.	Textile Products & Apparel
8.	Wood Products & Furniture
9.	Paper, Printing, & Publishing
10.	Chemicals & Chemical Products
11.	Petroleum & Coal Products
12.	Rubber, Plastic, & Leather
13.	Stone, Clay, & Glass Products
14.	Primary & Fabricated Metals
15.	Machinery, Except Electrical
16.	Electrical Equipment & Supplies
17.	Transport Equipment & Ordnance
18.	Other Manufacturing
19.	Transportation & Trade
20.	Electric, Gas, & Sanitary Services
21.	Other Services
22.	Government Enterprises
23.	Scrap & Secondhand Goods

Source: Miller, Ronald E. and Peter D. Blair, 1985. Input-output anlaysis: foundations and extensions. [Englewood Cliffs, NJ]: Prentice-Hall, Inc., p. 406.

TABLE 4

PRICE INDICES FOR THE 25-SECTOR USE TABLE

	Sector Description (1)	1977 Index (2)	1984 Index (3)	Adjustment Index (4)
1.	Agric. Forestry & Fisheries	2.167	2.796	1.29
2.	Metal Mining	1.923	2.787	1.45
3.	Petroleum & Natural Gas	3.310	8.890	2.69
4.	Other Mining	1.763	2.875	1.63
5.	Construction	1.007	1.614	1.60
6.	Food, Feed, & Tobacco Prod.	1.919	2.698	1.41
7.	Textile Products & Apparel	1.306	1.823	1.40
8.	Wood Products & Furniture	1.927	2.834	1.47
9.	Paper, Printing, & Publishing	1.991	3.071	1.54
10.	Chemicals & Chemical Products	1.705	2.675	1.57
11.	Petroleum & Coal Products	3.700	7.878	2.13
12.	Rubber, Plastics, & Leather	1.729	2.733	1.58
13.	Stone, Clay, & Glass Products	1.962	3.195	1.63
14.	Primary & Fabricated Metals	2.024	2.977	1.47
15.	Machinery, Except Electrical	1.854	3.037	1.64
16.	Electrical Equip. & Supplies	1.560	2.432	1.56
17.	Transport Equip. & Ordnance	1.680	2.841	1.69
18.	Other Manufacturing	1.794	2.830	1.58
19.	Transportation & Trade	1.803	3.525	1.96
20.	Electric, Gas, & Sanitary Serv.	2.061	4.769	2.31
21.	Other Services	1.708	2.863	1.68
22.	Government Enterprises	1.831	2.985	1.63
23.	Scrap & Secondhand Goods	1.827	3.326	1.82
24.	Ecmployee Compensation	1.815	3.111	1.71
25.	Other Primary Payments	1.833	3.080	1.68

Source: Appendix D.

as the amount of commodity i that is required by industry j to produce one dollar of output. In other words, the bij coefficients are industry input coefficients that have been standardized on the basis of a one dollar of industry output. The industry input coefficients table for the 23-sector, price updated, national Use table is given in Table 6. Notice that Table 6 actually includes 24 sectors, where the 24th sector is the employee sector, consisting of an Employee Compensation row and an Employee Expenditures column. As indicated earlier, this employee sector has been added to the I/O model so that the induced-by effects from employee compensation/expenditures can be included in the estimation of total socioeconomic effects.

STEP TWO: The input coefficients of Table 6 include competitive imports, because the national Use table includes imports. Competitive imports need to be removed so that the sector input coefficients reflect only purchases of domestic inputs. The removal of competitive imports is Step Two of the six-step exercise that was used to construct the nonsurvey MMS I/O models.

Using information contained in the national Use table, competitive import proportions by commodity can be calculated. Multiplying the residual of these proportions (i.e., 1 - import proportion of commodity i) times the corresponding row for commodity i of the Use table yields estimates of domestically produced commodities. The removal of competitive imports results in an input coefficients table that reflects only domestic inputs by industry. The competitive import proportions for the 24 sectors, including the Employee Compensation sector, are given in Table 7, and the sector input coefficients table, with imports removed, is given in Table 8. This technique of removing competitive imports involves the assumption that the proportion of competitive imports used as inputs is uniform across all industries.

STEP THREE: Step Three involves the use of an Aggregation Directory to collapse columns of the Use table and corresponding rows of the Make table. For illustrative purposes, imagine that eight sectors have been defined for our hypothetical study region, as shown in Figure Four. Figure Four is called an Aggregation Directory which groups the original 24 sectors into eight new sectors, including an employee sector. A similar directory was developed for the ten MMS Coastal Areas that reclassified the 537 industries of the national Use and Make tables into 116 producing sectors plus one employee sector for the MMS study. (The employee sector was later disaggregated into three employee sectors to correspond to the three employee classes; that is, local, commuter, and relocator.) This directory is given in Appendix C.

For the MMS I/O sectors, sector weights, like those shown in column three of Table 9, were developed from industry employment data files. These weights were then multiplied times the corresponding column sector input coefficients of the price adjusted/import adjusted, 537-level national Use table of Step Two. Then, the weighted sector input coefficients were aggregated in accordance with the 116 MMS sector aggregation directory, which is similar to the one shown in Figure Four. This produced a Use table for each Coastal Area that contains 117 column sectors and 538 commodity/service rows, including the employee sector as

FIGURE FOUR

INDUSTRY AGGREGATION DIRECTORY

7-Industry Aggregation	23-Industry Aggregation
1. Agriculture	Agriculture, Forestry, & Fishing
2. Mining	Metal Mining
	Petroleum & Natural Gas Mining
	Other Mining
3. Construction	Construction
4. Manufacturing	Food, Feed, & Tobacco Products
	Textile Products & Apparel
	Wood Products & Furniture
	Paper, Printing, & Publishing
	Chemicals & Chemical Products
	Petroleum & Coal Products
	Rubber, Plastics, & Leather
	Stone, Clay, & Glass Products
	Primary & Fabricated Metals
	Machinery, Except Electrical
	Electrical Equipment & Supplies
	Transport Equipment & Ordnance
	Other Manufacturing
5. Transportation & Trade	Transportation & Trade
6. Services	Electric, Gas, & Sanitary Services
7. Other	Government Enterprises; Scrap & Secondhand Goods
8. Employee Compensation and Expenditures	Employee Compensation and Expenditures

Source: Figure Three.

TABLE 5

TWENTY-THREE SECTOR U.S. USE TABLE
UPDATED TO 1984 PRICES

	Ag	Metal Mining	Petro Mining	Other Mining	Constr	Food & Feed	Textil Prod	Wood & Furnit	Paper Print	Chem	Petro Prod	Rubber Plast	Stone Clay	Metals	Non-elc Mach	Elect Equip	Transp Equip	Other Manuf	Transp Trade	Utilit	Other Servic	Gov't Enterp	House-holds	Other payment
Agriculture	41110	0	3	8	849	71843	3011	4905	28	516	0	0	5	4	1	3	3	35	829	9	5768	210	0	14678
Metal Mining	0	682	0	0	0	0	0	0	4	945	0	0	19	8200	0	15	0	1	0	0	0	0	0	0
Petro Mining	0	0	6192	0	0	0	0	0	0	4893	161535	143	0	73	0	0	0	0	213	35368	0	0	0	0
Other Mining	266	52	0	4494	3332	191	65	16	544	2717	370	80	3234	5702	49	26	88	55	7	9886	36	1959	0	386
Construction	2213	56	4349	272	486	1413	568	512	1085	1402	1309	421	803	3784	856	667	795	315	11491	5939	45354	7954	0	0
Food & Feed	16015	1	7	1	14	50554	31	51	350	1669	49	761	30	30	24	16	13	100	563	7	38751	692	0	171941
Textile Prod	396	1	15	57	2009	102	45622	1604	1086	197	28	2832	182	129	160	118	4283	988	559	6	2892	108	0	56265
Wood & Furn	288	43	0	104	27784	122	22	20424	3956	98	34	212	422	711	298	747	2086	684	662	87	265	0	0	14341
Paper&Print	465	3	25	79	1287	10686	1244	607	40782	3855	772	1677	1418	1540	1056	1665	604	2094	7458	172	15974	470	0	24233
Chemicals	12144	264	644	548	5613	3346	13548	1474	5919	48888	5277	15400	2028	6903	873	2597	1926	3215	479	504	11365	421	0	28634
Petroleum	7570	247	552	1165	15374	1646	986	1108	3214	4801	16516	1123	1348	3425	1218	686	1197	605	29503	17251	10286	2260	0	82207
Rubber&Plast	1049	139	35	313	4778	3258	1858	1646	1980	2967	237	5825	305	2041	3124	4490	8753	2395	3343	96	5165	119	0	22205
Stone&Clay	122	37	29	130	26693	4945	200	595	155	1081	321	579	6720	1757	1154	1777	2978	499	396	15	2116	104	0	3182
Prim&Fab Met	428	406	1113	809	48779	10049	110	4929	941	5163	875	1405	1070	89222	28650	16152	42996	5402	1895	229	5690	96	0	4805
Equip ex.Ele	1551	513	1145	2558	8879	508	751	599	973	1645	274	554	643	6916	28042	2116	11101	643	2214	1150	5934	418	0	2586
Elec equip	636	39	421	207	11283	27	76	114	34	55	11	87	87	1579	8168	20224	10697	2401	994	314	7493	460	0	30081
Trans equip	493	78	8	81	223	14	8	85	25	12	172	47	139	139	995	95	65269	22	4080	47	9689	254	0	91672
Trans&trade	38	19	57	43	1950	87	1008	81	992	224	43	202	109	392	559	841	1128	3468	1559	205	8741	150	0	26844
Other Manuf	14727	543	1133	1719	57306	29284	8665	7724	14900	16370	9508	5308	6341	27785	14351	11256	17007	5978	60758	6199	47373	4486	0	501290
Utilities	3749	917	1733	1841	1927	4869	2650	1622	4888	10494	5493	2021	4077	13296	2636	2225	3079	922	19621	49494	29171	8196	0	96613
Other Servic	20032	625	10440	2873	35073	21862	7237	4507	13816	18147	5450	5183	3447	12751	10663	11108	12912	7434	143531	5148	266964	4892	0	38200
Gov't Enterp	96	21	31	46	271	613	434	139	1558	318	161	174	103	394	313	385	452	225	3565	541	9066	597	0	10217
Scrap	0	27	0	64	53	0	142	0	925	73	0	5	78	6463	189	100	395	0	87	0	408	2	0	0
Households	19868	3035	6105	12734	154536	45298	37071	24060	48636	35681	8901	22372	17965	84847	65579	53904	76521	23588	361827	20518	474195	37071	0	10140
Other Paymnt	62802	1462	51111	10263	35685	50833	12702	13154	23414	29808	15261	11955	9272	33059	28631	16835	24938	13741	226279	55094	642274	346382	0	928114

TABLE 6

PRICE UPDATED DIRECT INPUT REQUIREMENTS
FOR THE TWENTY-THREE U.S. SECTORS

	Ag	Metal Mining	Petro Mining	Other Mining	Constr	Food & Feed	Textil Prod	Wood & Furnit	Paper Print	Chem	Petro Prod	Rubber Plast	Stone Clay	Metals	Non-elc Mach	Elect Equip	Transp Equip	Other Manuf	Transp Trade	Utilit	Other Servic	Gov't Enterp	Scrap	Emp Exp
Agriculture	.1995	.0000	.0000	.0002	.0019	.2306	.0218	.0545	.0002	.0027	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0005	.0009	.0000	.0035	.0005	.0000	.0068
Metal Mining	.0000	.0740	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0049	.0000	.0000	.0003	.0264	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Petro Mining	.0000	.0000	.0727	.0000	.0000	.0000	.0000	.0000	.0000	.0255	.6945	.0018	.0000	.0002	.0000	.0000	.0000	.0000	.0002	.1698	.0000	.0000	.0000	.0000
Other Mining	.0013	.0057	.0000	.1112	.0075	.0006	.0005	.0002	.0032	.0142	.0016	.0010	.0540	.0183	.0002	.0002	.0003	.0007	.0000	.0475	.0000	.0047	.0000	.0002
Construction	.0107	.0061	.0511	.0067	.0011	.0045	.0041	.0057	.0064	.0073	.0056	.0054	.0134	.0122	.0043	.0045	.0027	.0042	.0130	.0285	.0276	.0191	.0000	.0000
Food & Feed	.0777	.0002	.0001	.0000	.0000	.1623	.0002	.0006	.0021	.0087	.0002	.0097	.0005	.0001	.0001	.0001	.0000	.0013	.0006	.0000	.0236	.0017	.0000	.0797
Textile Prod	.0019	.0002	.0002	.0014	.0045	.0003	.3306	.0178	.0064	.0010	.0001	.0361	.0030	.0004	.0008	.0008	.0148	.0132	.0006	.0000	.0018	.0003	.0000	.0261
Wood & Furn	.0014	.0046	.0000	.0026	.0626	.0004	.0002	.2270	.0232	.0005	.0001	.0027	.0070	.0023	.0015	.0050	.0072	.0091	.0008	.0004	.0002	.0000	.0000	.0066
Paper&Print	.0023	.0003	.0003	.0019	.0029	.0343	.0090	.0067	.2396	.0201	.0033	.0214	.0237	.0049	.0053	.0112	.0021	.0280	.0085	.0008	.0097	.0011	.0000	.0112
Chemicals	.0589	.0286	.0076	.0136	.0126	.0107	.0982	.0164	.0348	.2546	.0227	.1965	.0339	.0222	.0044	.0175	.0067	.0430	.0005	.0024	.0069	.0010	.0000	.0133
Petroleum	.0367	.0268	.0065	.0288	.0346	.0053	.0071	.0123	.0189	.0250	.0710	.0143	.0225	.0110	.0062	.0046	.0041	.0081	.0335	.0828	.0063	.0054	.0000	.0381
Rubber&Plast	.0051	.0151	.0004	.0077	.0108	.0105	.0135	.0183	.0116	.0155	.0010	.0743	.0051	.0066	.0158	.0303	.0303	.0320	.0038	.0005	.0031	.0003	.0000	.0103
Stone&Clay	.0006	.0041	.0003	.0032	.0601	.0159	.0015	.0066	.0009	.0056	.0014	.0074	.1123	.0056	.0058	.0120	.0103	.0067	.0004	.0001	.0013	.0002	.0000	.0015
Prim&Fab Met	.0021	.0440	.0131	.0200	.1098	.0323	.0008	.0548	.0055	.0269	.0038	.0179	.0179	.2868	.1450	.1091	.1487	.0722	.0021	.0011	.0035	.0002	.0000	.0022
Equip ex.Ele	.0075	.0557	.0134	.0633	.0200	.0016	.0054	.0067	.0057	.0086	.0012	.0071	.0107	.0222	.1419	.0143	.0384	.0086	.0025	.0055	.0036	.0010	.0000	.0012
Elec equip	.0031	.0042	.0049	.0051	.0254	.0001	.0006	.0013	.0002	.0003	.0000	.0011	.0015	.0051	.0413	.1366	.0370	.0321	.0011	.0015	.0046	.0011	.0000	.0139
Trans equip	.0024	.0084	.0001	.0020	.0005	.0000	.0001	.0009	.0001	.0001	.0007	.0006	.0023	.0004	.0050	.0006	.2257	.0003	.0046	.0002	.0059	.0006	.0000	.0425
Trans&trade	.0002	.0021	.0007	.0011	.0044	.0003	.0073	.0009	.0058	.0012	.0002	.0026	.0018	.0013	.0028	.0057	.0039	.0464	.0018	.0010	.0053	.0004	.0000	.0124
Other Manuf	.0715	.0589	.0133	.0425	.1290	.0940	.0628	.0859	.0875	.0853	.0409	.0677	.1059	.0893	.0726	.0760	.0588	.0799	.0689	.0298	.0288	.0108	.0000	.2322
Utilities	.0182	.0996	.0203	.0456	.0043	.0156	.0192	.0180	.0287	.0547	.0236	.0258	.0681	.0427	.0133	.0150	.0106	.0123	.0222	.2376	.0177	.0196	.0000	.0448
Other Servic	.0972	.0679	.1226	.0711	.0790	.0702	.0524	.0501	.0812	.0945	.0234	.0661	.0576	.0410	.0540	.0750	.0446	.0994	.1627	.0247	.1623	.0117	.0000	.0177
Gov't Enterp	.0005	.0023	.0004	.0011	.0006	.0020	.0031	.0015	.0092	.0017	.0007	.0022	.0017	.0013	.0016	.0026	.0016	.0030	.0040	.0026	.0055	.0014	.0000	.0047
Scrap	.0000	.0030	.0000	.0016	.0001	.0000	.0010	.0000	.0054	.0004	.0000	.0001	.0013	.0208	.0010	.0007	.0014	.0000	.0001	.0000	.0002	.0000	.0000	.0000
Emp Comp	.0964	.3295	.0717	.3151	.3479	.1454	.2686	.2675	.2857	.1858	.0383	.2855	.3002	.2727	.3319	.3641	.2646	.3153	.4103	.0985	.2883	.0888	.0000	.0047

Source: Table 5.

TABLE 7

COMPETITIVE IMPORT PROPORTIONS

Sector No. (1)	Competitive Imports (millions of $) (2)	Sector Output (millions of $) (3)	Import Proportion (4)
1	2,712	129,663	0.0209
2	1,901	5,356	0.3549
3	35,062	49,083	0.7143
4	603	23,592	0.0256
5	0	264,334	0.0000
6	8,630	202,053	0.0427
7	7,597	87,237	0.0871
8	4,321	55,671	0.0776
9	4,098	101,544	0.0404
10	6,211	112,483	0.0552
11	11,366	98,895	0.1149
12	5,195	47,022	0.1105
13	1,713	34,613	0.0495
14	14,684	188,385	0.0779
15	7,510	118,665	0.0633
16	11,398	89,020	0.1280
17	20,396	174,581	0.1168
18	6,941	44,814	0.1549
19	332	510,639	0.0007
20	2,200	105,596	0.0208
21	936	974,237	0.0010
22	0	246,512	0.0000
23	264	2,250	0.1173
24	0	1,165,555	0.0000

Source: Bureau of Economic Analysis, U.S. Department of Commerce, 1984. The detailed input-output structure of the U.S. economy, 1977, Volume I, Table 1. [Washington, D.C.]: U.S. Government Printing Office.

TABLE 8

PRICE UPDATED DIRECT INPUT REQUIREMENTS
FOR THE TWENTY-THREE U.S. SECTORS
WITH IMPORTS REMOVED

	Ag	Metal Mining	Petro Mining	Other Mining	Constr	Food & Feed	Textil Prod	Wood & Furnit	Paper Print	Chem	Petro Prod	Rubber Plast	Stone Clay	Metals	Non-elc Mach	Elect Equip	Transp Equip	Other Manuf	Transp Trade	Utilit	Other Servic	Gov't Enterp	Scrap	Emp Exp
Agriculture	.1953	.0000	.0000	.0002	.0019	.2258	.0214	.0534	.0002	.0026	.0000	.0000	.0001	.0000	.0000	.0000	.0000	.0005	.0009	.0000	.0034	.0005	.0000	.0067
Metal Mining	.0000	.0477	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0032	.0000	.0000	.0002	.0170	.0000	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Petro Mining	.0000	.0000	.0208	.0000	.0000	.0000	.0000	.0000	.0000	.0073	.1984	.0005	.0000	.0001	.0000	.0000	.0000	.0000	.0001	.0485	.0000	.0000	.0000	.0000
Other Mining	.0013	.0055	.0000	.1084	.0073	.0006	.0005	.0002	.0031	.0138	.0016	.0010	.0527	.0179	.0002	.0002	.0003	.0007	.0000	.0462	.0000	.0046	.0000	.0002
Construction	.0107	.0061	.0511	.0067	.0011	.0045	.0041	.0057	.0064	.0073	.0056	.0054	.0134	.0122	.0043	.0045	.0027	.0042	.0130	.0285	.0276	.0191	.0000	.0000
Food & Feed	.0744	.0001	.0001	.0000	.0000	.1553	.0002	.0005	.0020	.0083	.0002	.0093	.0005	.0001	.0001	.0001	.0000	.0013	.0006	.0000	.0226	.0016	.0000	.0763
Textile Prod	.0018	.0001	.0002	.0013	.0041	.0003	.3018	.0163	.0058	.0009	.0001	.0330	.0028	.0004	.0007	.0007	.0135	.0121	.0006	.0000	.0016	.0002	.0000	.0238
Wood & Furn	.0013	.0043	.0000	.0024	.0577	.0004	.0001	.2094	.0214	.0005	.0001	.0025	.0065	.0021	.0014	.0047	.0067	.0084	.0007	.0004	.0001	.0000	.0000	.0061
Paper&Print	.0022	.0003	.0003	.0019	.0028	.0329	.0087	.0065	.2299	.0193	.0032	.0205	.0227	.0047	.0051	.0108	.0020	.0269	.0081	.0008	.0093	.0011	.0000	.0108
Chemicals	.0557	.0271	.0071	.0128	.0119	.0101	.0927	.0155	.0329	.2405	.0214	.1857	.0320	.0210	.0042	.0166	.0063	.0406	.0005	.0023	.0065	.0010	.0000	.0125
Petroleum	.0325	.0237	.0057	.0255	.0306	.0047	.0063	.0109	.0167	.0221	.0628	.0127	.0199	.0097	.0055	.0041	.0037	.0072	.0296	.0733	.0055	.0048	.0000	.0337
Rubber&Plast	.0045	.0134	.0004	.0069	.0096	.0093	.0120	.0163	.0103	.0137	.0009	.0661	.0045	.0058	.0141	.0270	.0269	.0285	.0034	.0004	.0028	.0003	.0000	.0092
Stone&Clay	.0006	.0039	.0003	.0031	.0571	.0151	.0014	.0063	.0009	.0053	.0013	.0070	.1067	.0054	.0056	.0114	.0098	.0063	.0004	.0001	.0012	.0002	.0000	.0014
Prim&Fab Met	.0019	.0406	.0121	.0184	.1013	.0297	.0007	.0505	.0051	.0248	.0035	.0165	.0165	.2644	.1337	.1006	.1371	.0666	.0020	.0010	.0032	.0002	.0000	.0021
Equip ex.Ele	.0071	.0522	.0126	.0593	.0187	.0015	.0051	.0062	.0054	.0080	.0011	.0066	.0101	.0208	.1329	.0134	.0360	.0080	.0024	.0052	.0034	.0009	.0000	.0011
Elec equip	.0027	.0037	.0043	.0045	.0222	.0001	.0005	.0011	.0002	.0002	.0000	.0010	.0013	.0044	.0360	.1191	.0323	.0280	.0010	.0013	.0040	.0010	.0000	.0122
Trans equip	.0021	.0075	.0001	.0018	.0004	.0000	.0001	.0008	.0001	.0001	.0007	.0005	.0020	.0004	.0044	.0006	.1993	.0003	.0041	.0002	.0052	.0005	.0000	.0375
Trans&trade	.0002	.0017	.0006	.0009	.0037	.0002	.0062	.0008	.0049	.0010	.0002	.0022	.0015	.0011	.0024	.0048	.0033	.0392	.0015	.0008	.0045	.0003	.0000	.0105
Other Manuf	.0714	.0589	.0133	.0425	.1289	.0939	.0627	.0858	.0875	.0852	.0408	.0677	.1059	.0892	.0726	.0760	.0588	.0799	.0688	.0297	.0288	.0107	.0000	.2321
Utilities	.0178	.0975	.0199	.0446	.0042	.0153	.0188	.0177	.0281	.0535	.0231	.0253	.0667	.0418	.0131	.0147	.0104	.0121	.0218	.2327	.0174	.0192	.0000	.0438
Other Servic	.0971	.0678	.1225	.0710	.0789	.0701	.0524	.0501	.0811	.0944	.0234	.0661	.0575	.0409	.0539	.0750	.0446	.0993	.1626	.0247	.1621	.0117	.0000	.0177
Gov't Enterp	.0005	.0023	.0004	.0011	.0006	.0020	.0031	.0015	.0092	.0017	.0007	.0022	.0017	.0013	.0016	.0026	.0016	.0030	.0040	.0026	.0055	.0014	.0000	.0047
Scrap	.0000	.0026	.0000	.0014	.0001	.0000	.0009	.0000	.0048	.0003	.0000	.0001	.0012	.0183	.0008	.0006	.0012	.0000	.0001	.0000	.0002	.0000	.0000	.0000
Emp Comp	.0964	.3295	.0717	.3151	.3479	.1454	.2686	.2675	.2857	.1858	.0383	.2855	.3002	.2727	.3319	.3641	.2646	.3153	.4103	.0985	.2883	.0888	.0000	.0047

Source: Tables 6 and 7.

TABLE 9

INDUSTRY WEIGHTS
(hypothetical)

7-Industry Aggregation (1)	23-Industry Categories (2)	Industry Weights (3)
1. Agriculture		
	Agriculture, Forestry, & Fisheries	1.0000
2. Mining		
	Metal Mining	0.0452
	Petroleum & Natural Gas Mining	0.4748
	Other Mining	0.1792
3. Construction		
	Construction	1.0000
4. Manufacturing		
	Food, Feed, & Tobacco Products	0.0923
	Textile Products & Apparel	0.0641
	Wood Products & Furniture	0.0516
	Paper, Printing, & Publishing	0.0798
	Chemicals & Chemical Products	0.0885
	Petroleum & Coal Products	0.1213
	Rubber, Plastics, & Leather	0.1001
	Stone, Clay, & Glass Products	0.0815
	Primary & Fabricated Metals	0.0604
	Machinery, Except Electrical	0.0513
	Electrical Equipment & Supplies	0.0667
	Transport Equipment & Ordnance	0.0681
	Other Manufacturing	0.0743
5. Transportation & Trade		
	Transportation & Trade	1.0000
6. Services		
	Electric, Gas, & Sanitary Services	0.5100
	Other Services	0.4900
7. Other	Government Enterprises	0.0729
	Scrap & Secondhand Goods	0.9271
8. Employee Compensation		
	Employee Compensation	1.0000

Source: Figure Three, with hypothetical weights.

the 117th column and the 538th row. A different set of sector weights was developed and used for each Coastal Area to reflect each Area's particular industry mix or composition. For our illustrative case, the collapsed Use table (Table 10) has 8 columns (representing the 8 sectors which includes the Employee Expenditures column) and 24 rows (representing the 23 commodities plus the Employee Compensation row). It should be noted that the sector (or industry) mix adjustment step does not adjust for possible differences in production technologies between the nation and the study area. In fact, it is commonly assumed that national technical input coefficients are appropriate for use at the regional level. This assumption was followed in the derivation of the I/O models for the ten MMS Coastal Areas.

A similar aggregation procedure was used to collapse the Make table, where in this case, rows are collapsed. Before the rows are collapsed, however, make coefficients need to be computed. To review, column elements of the original Make table indicate the amounts that various producing sectors contributed to the total production of commodity j. Therefore, the division of a column element by the corresponding column sum yields a make coefficient, defined as a d_{ij} coefficient. For our illustration, the make coefficients table for the original 24-sector Make table is given in Table 11. To collapse this 24-sector Make table to an 8-sector level, based on the aggregation directory of Figure Four, involves simply summing the rows in accordance to the aggregation directory of Figure Four. Sector weights are not used here. Weights are not necessary because the fraction that the newly defined sector produces of a commodity equals the simple sum of the individual fractions of the original sectors. For the illustration, the new 8-sector Make coefficients table contains 8 rows and 24 columns, as shown in Table 12. For the MMS study, the aggregated Make coefficients tables contains 117 rows and 538 columns, where the 117th row and 538th column is the Employee Compensation sector and Employee Expenditures sector, respectively. Since it is not necessary to weight the make coefficients, only one aggregated or collapsed make coefficients table was created for the 10 MMS Coastal Areas.

STEP FOUR: Step Four of the 6-step procedure for constructing the nonsurvey I/O models for the ten MMS Coastal Areas involved, through matrix multiplication, the combining of the Use input coefficients table, like Table 10, with the Make coefficients table, like Table 12. Let 'B' represent the Use input coefficients matrix of Table 10 which has dimensions of 24 rows and 8 columns. Similarly, let 'D' represent the Make coefficients matrix of Table 12, with its dimensions of 8 rows and 24 columns. Multiplying the matrix 'D' times the matrix 'B' produces a sector-by-sector (or industry-by-industry) input coefficients matrix, as shown in Table 13. This matrix is called the 'A' matrix, which is the direct requirements table of an I/O model. The Direct Requirements tables for the ten MMS Coastal Areas contain 117 rows and columns for the 117 sectors, where the 117th sector is the Employee sector.

STEP FIVE: The next step, Step Five, involves the adjustment of the direct requirements table, such as Table 13, to reflect the area's trade patterns. Without this adjustment, the sector input coefficients

TABLE 10

COLUMN-SECTOR AGGREGATION

	Agriculture	Mining	Construction	Manufacture	Transport & Trade	Services	Other	Employee Expend
Agriculture	.1953	.0000	.0019	.0253	.0009	.0017	.0000	.0067
Metal Mining	.0000	.0022	.0000	.0013	.0000	.0000	.0000	.0000
Petro Mining	.0000	.0099	.0000	.0248	.0248	.0000	.0000	.0000
Other Mining	.0013	.0197	.0073	.0073	.0236	.0000	.0003	.0002
Construction	.0107	.0257	.0011	.0062	.0276	.0135	.0014	.0000
Food & Feed	.0744	.0001	.0000	.0164	.0006	.0111	.0001	.0763
Textile Prod	.0018	.0003	.0041	.0262	.0006	.0008	.0000	.0238
Wood & Furn	.0013	.0006	.0577	.0150	.0009	.0001	.0000	.0061
Paper&Print	.0022	.0005	.0028	.0317	.0085	.0046	.0001	.0108
Chemicals	.0557	.0069	.0119	.0614	.0017	.0032	.0001	.0125
Petroleum	.0325	.0084	.0306	.0171	.0670	.0027	.0003	.0337
Rubber&Plast	.0045	.0020	.0096	.0184	.0036	.0014	.0000	.0092
Stone&Clay	.0006	.0009	.0571	.0144	.0005	.0006	.0000	.0014
Prim&Fab Met	.0019	.0109	.1013	.0552	.0025	.0016	.0000	.0021
Equip ex.Ele	.0071	.0190	.0187	.0156	.0050	.0017	.0001	.0011
Elec equip	.0027	.0030	.0222	.0147	.0017	.0019	.0001	.0122
Trans equip	.0021	.0007	.0004	.0142	.0042	.0025	.0000	.0375
Trans&trade	.0002	.0005	.0037	.0049	.0019	.0022	.0000	.0105
Other Manuf	.0714	.0166	.1289	.0761	.0840	.0141	.0008	.2321
Utilities	.0178	.0219	.0042	.0271	.1405	.0085	.0014	.0438
Other Servic	.0971	.0739	.0789	.0620	.1752	.0794	.0009	.0177
Gov't Enterp	.0005	.0005	.0006	.0024	.0054	.0027	.0001	.0047
Scrap	.0000	.0004	.0001	.0018	.0001	.0001	.0000	.0000
Employee Comp	.0964	.1054	.3479	.2406	.4605	.1413	.0065	.0047

Source: Tables 8 and 9 and Figure Three.

suggest that the area's sectors buy all of their required inputs from producers (suppliers) located within the area, like those shown in Table 13. In other words, nothing is imported from other regions. Since imports are an important part of regional production, sector input coefficients need to be adjusted to reflect imports or, more generally, to reflect regional trade patterns. A number of techniques have been used and reported in the literature to adjust for regional trade patterns. These techniques include the simple location quotient, purchase only location quotient, cross-industry quotient, supply-demand pool method, and the regional purchase coefficients technique. The technique described here and used to generate I/O models for the MMS Coastal Areas is the Simple Location Quotient method. SAM contains specific commands that permit the analyst to use other regional trade adjustment techniques. These are noted in the Commands section of this manual.

To view the formulation of the Simple Location Quotient (SLQ) technique, let E^R and E_i^R denote region R's total employment and sector i employment, respectively. In like fashion, let E^N and E_i^N represent the nation's total employment and sector i employment, respectively. Therefore, SLQ for sector i is defined as:

$$SLQ_i = E_i^R \; / \; E^R \div E_i^N \; / \; E^N$$

The interpretation of the SLQ measure is as follows. If SLQ_i is greater than one, it can be said that sector i is more concentrated in region R than in the nation. Moreover, it can be said that region R specializes in the output of sector i and, hence, exports some of its output to the rest of the nation and the world. On the other hand, if SLQ_i is less than one, it can be said that sector i is less concentrated in region R than in the nation, and therefore, the region imports products from a sector i that is located outside the region. Applying this interpretation to sector input coefficients (e.g., the direct requirements table of Table 13) leads to the following rules. If sector i is less concentrated in the region than in the nation (SLQi < 1), it is viewed as less capable of satisfying regional demand for its output, and its regional direct input coefficients need to be adjusted downward. More specifically, the input coefficients recorded in the row for sector i (e.g., Table 13) are multiplied times the SLQi value for sector i. On the other hand, if sector i is more highly concentrated in the region than in the nation (SLQi > 1), then it is assumed that the national sector input coefficients will apply to the region, and the regional "surplus" produced by sector i will be exported to the rest of the nation and the world.

Suppose that the simple location quotients for the eight sectors defined for our illustrative region are represented in Table 14.

TABLE 11

SECTOR OUTPUT PROPORTIONS BY SECTOR
FOR THE TWENTY-THREE U.S. SECTORS

	Ag	Metal Mining	Petro Mining	Other Mining	Constr	Food & Feed	Textil Prod	Wood & Furnit	Paper Print	Chem	Petro Prod	Rubber Plast	Stone Clay	Metals	Non-elc Mach	Elect Equip	Transp Equip	Other Manuf	Transp Trade	Utilit	Other Servic	Gov't Enterp	Scrap	Emp Exp
Agriculture	.9997	.0000	.0000	.0000	.0000	.0176	.0000	.0018	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0000
Metal Mining	.0000	.9972	.0000	.0005	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Petro Mining	.0000	.0007	.9969	.0001	.0000	.0000	.0000	.0000	.0000	.0005	.0340	.0000	.0002	.0000	.0004	.0000	.0000	.0000	.0000	.0188	.0000	.0000	.0000	.0000
Other Mining	.0000	.0021	.0000	.9824	.0000	.0000	.0000	.0000	.0000	.0068	.0003	.0000	.0050	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Construction	.0000	.0000	.0000	.0000	1.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Food & Feed	.0001	.0000	.0000	.0000	.0000	.9790	.0001	.0001	.0007	.0033	.0000	.0013	.0000	.0004	.0002	.0000	.0000	.0003	.0000	.0000	.0000	.0000	.0120	.0000
Textile Prod	.0000	.0000	.0000	.0000	.0000	.0000	.9869	.0018	.0020	.0106	.0001	.0037	.0015	.0001	.0004	.0001	.0000	.0031	.0000	.0000	.0000	.0000	.0240	.0000
Wood & Furn	.0000	.0000	.0000	.0000	.0000	.0000	.0006	.9829	.0010	.0006	.0000	.0018	.0024	.0011	.0006	.0009	.0003	.0024	.0000	.0000	.0000	.0000	.0102	.0000
Paper&Print	.0000	.0000	.0000	.0000	.0000	.0001	.0018	.0017	.9832	.0020	.0000	.0092	.0008	.0015	.0017	.0016	.0000	.0078	.0000	.0000	.0182	.0000	.1152	.0000
Chemicals	.0000	.0000	.0011	.0061	.0000	.0030	.0050	.0001	.0018	.8969	.0125	.0121	.0037	.0008	.0015	.0019	.0001	.0120	.0000	.0000	.0000	.0000	.0289	.0000
Petroleum	.0000	.0000	.0000	.0019	.0000	.0000	.0001	.0000	.0002	.0592	.9520	.0004	.0032	.0002	.0001	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0040	.0000
Rubber&Plast	.0000	.0000	.0000	.0001	.0000	.0001	.0027	.0013	.0016	.0044	.0000	.9516	.0028	.0011	.0020	.0008	.0007	.0031	.0000	.0000	.0000	.0000	.0000	.0000
Stone&Clay	.0000	.0000	.0000	.0088	.0000	.0000	.0003	.0006	.0008	.0013	.0006	.0019	.9671	.0004	.0006	.0008	.0002	.0011	.0000	.0000	.0000	.0000	.0000	.0000
Prim&Fab Met	.0000	.0000	.0000	.0001	.0000	.0000	.0004	.0032	.0049	.0059	.0000	.0060	.0059	.9670	.0153	.0077	.0045	.0066	.0000	.0004	.0000	.0000	.4469	.0000
Equip ex.Ele	.0000	.0000	.0000	.0000	.0000	.0000	.0003	.0016	.0011	.0020	.0000	.0032	.0012	.0104	.9426	.0182	.0090	.0102	.0000	.0000	.0000	.0000	.0671	.0000
Elec equip	.0000	.0000	.0000	.0000	.0000	.0000	.0004	.0013	.0007	.0009	.0000	.0025	.0018	.0056	.0151	.9480	.0057	.0110	.0000	.0000	.0000	.0000	.0960	.0000
Trans equip	.0000	.0000	.0000	.0000	.0000	.0000	.0006	.0020	.0006	.0002	.0001	.0015	.0017	.0098	.0166	.0130	.9788	.0055	.0000	.0000	.0000	.0000	.1436	.0000
Trans&trade	.0000	.0000	.0000	.0000	.0000	.0000	.0008	.0014	.0016	.0038	.0000	.0049	.0020	.0015	.0028	.0070	.0008	.9367	.0000	.0000	.0008	.0000	.0218	.0000
Other Manuf	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.9900	.0103	.0000	.0000	.0302	.0000
Utilities	.0000	.0000	.0020	.0000	.0000	.0000	.0000	.0000	.0000	.0012	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.8598	.0000	.0002	.0000	.0000
Other Servic	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.9762	.0000	.0000	.0000
Gov't Enterp	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0003	.0000	.0000	.0007	.0000	.0000	.0000	.0000	.0000	.0100	.1107	.0047	.9998	.0000	.0000
Scrap	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Emp Comp	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	1.0000

Source: Table 3.

TABLE 12

ROW-SECTOR AGGREGATION

	Ag	Metal Mining	Petro Mining	Other Mining	Constr	Food & Feed	Textil Prod	Wood & Furnit	Paper Print	Chem	Petro Prod	Rubber Plast	Stone Clay	Metals	Non-elc Mach	Elect Equip	Transp Equip	Other Manuf	Transp Trade	Utilit	Other Servic	Gov't Enterp	Scrap	Emp Exp
Agriculture	.9997	.0000	.0000	.0000	.0000	.0176	.0000	.0018	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0000	.0000	.0000
Mining	.0000	1.0000	.9969	.9830	.0000	.0000	.0000	.0000	.0000	.0073	.0343	.0000	.0052	.0000	.0004	.0000	.0000	.0000	.0000	.0188	.0000	.0000	.0000	.0000
Construction	.0000	.0000	.0000	.0000	1.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Manufacture	.0001	.0000	.0011	.0170	.0000	.9824	1.0000	.9982	1.0000	.9911	.9654	1.0000	.9941	1.0000	.9996	1.0000	1.0000	1.0000	.0000	.0004	.0190	.0000	.9698	.0000
Trans&Trade	.0003	.0000	.0020	.0000	.0000	.0000	.0000	.0000	.0000	.0012	.0003	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.9900	.8701	.0000	.0002	.0302	.0000
Services	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.9762	.0000	.0000	.0000
Other	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0003	.0000	.0000	.0007	.0000	.0000	.0000	.0000	.0000	.0100	.1107	.0047	.9998	.0000	.0000
Emp Comp	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	1.0000

Source: Tables 9 and 11 and Figure Three.

TABLE 13

EIGHT SECTOR DIRECT REQUIREMENTS TABLE
BEFORE REGIONALIZATION

	Agriculture	Mining	Construction	Manufacture & Trade	Transport Expend	Services	Other	Employee
Agriculture	.1966	.0001	.0020	.0256	.0010	.0019	.0000	.0080
Mining	.0031	.0321	.0087	.0348	.0529	.0003	.0004	.0023
Construction	.0107	.0257	.0011	.0062	.0276	.0135	.0014	.0000
Manufacture	.1858	.0554	.3203	.3069	.1001	.0356	.0009	.2348
Trans&Trade	.0863	.0355	.1314	.0991	.2055	.0214	.0020	.2679
Services	.0948	.0722	.0770	.0606	.1710	.0776	.0008	.0173
Other	.0036	.0034	.0028	.0065	.0226	.0042	.0003	.0120
Employee Comp	.0964	.1054	.3479	.2406	.4605	.1413	.0065	.0047

Source: Tables 11 and 12.

Based on the interpretation of location quotients, the SLQs for the Manufacturing, Other, and Employee Compensation sectors are set at 1.0, so that the national input coefficients for these three sectors remain unchanged. Multiplying the sector rows of Table 13 times the corresponding SLQ_i's of Table 14 produces a "regionalized" direct requirements table (Table 15).

As the above hypothetical case has illustrated, the use of the simple location quotient method for regionalizing input requirements involves only comparably defined data on regional and national output, or employment, or value added by industry (sector). For the MMS Coastal Area I/O models, employment data was used, which was developed mainly from County Business Pattern tapes. County Business Patterns data files are explained in a later section on the Data Base component of the SAM system.

STEP SIX: For the MMS study, the last step, Step Six, involved the disaggregation of the Employee Compensation row to reflect the three classes of labor employed in the MMS Coastal Areas; that is, local, commuter, and relocator. For our illustration, assume that the proportions of labor by class are 0.60, 0.25 and 0.15 for local, commuter, and relocator, respectively. Multiplying the proportions (coefficients) times the Employee Compensation coefficients row of Table 15 produces three Employee Compensation sectors to reflect labor source or class (see Table 16). This procedure for generating employee compensation coefficients by labor source assumes comparable pay for comparable work, and furthermore, it assumes that employee class is not correlated with occupation at the sector level. This means, as an example, the likelihood of a clerk commuting to a study region and being employed in a fabrications plant is the same as that of a welder commuting to the same region to work in the same fabrications plant. To complete Step Six, the Employee Expenditures column must be disaggregated into three columns to be consistent with the disaggregation of the Employee Compensation row.

For our illustration, the final regional direct requirements table, showing employee input by worker class, is given in Table 16. Notice in Table 16 that the employee expenditure coefficients for residents and relocators are identical. What this indicates is the assumption that both residents and relocators have identical expenditure patterns. Notice also that the commuter expenditures column of Table 16 shows only zeros. What is being shown and assumed here is that commuters do not spend any of their compensation within the study region. These same assumptions were used to construct the Employee Expenditures columns for the Coastal Areas' direct requirements tables.

Some explanation concerning the use of the above assumptions in the MMS study is in order. To say the least, these assumptions are surely inaccurate. For example, the assumption that residents and relocators have identical expenditure patterns is unrealistic, for it ignores the fact that a relocator will likely purchase a number of new household items in the process of establishing a new place of residence. However, the lack of suitable employee expenditures information by worker class precluded any differentiation in the expenditure patterns between

TABLE 14

SIMPLE LOCATION QUOTIENTS
(based on employment)

Sector Title (1)	National Employment (2)	Regional Employment (3)	Location Quotient (4)
Agriculture	13,456	2,105	0.858
Mining	7,086	240	0.187
Construction	15,860	2,305	0.797
Manufacturing	29,349	5,833	1.090 (1)
Transportation & Trade	34,005	6,024	0.971
Services	32,838	5,984	0.999
Other	23,857	6,048	1.390 (1)
Ecmployee Compensation	-	-	1.000
Total	156,451	28,539	

Source: Figure Four and hypothetical figures.

TABLE 15

REGIONALIZED DIRECT REQUIREMENTS TABLE

	Agriculture	Mining	Construction	Manufacture & Trade	Transport Expend	Services	Other	Employee
Agriculture	.1687	.0000	.0017	.0219	.0008	.0016	.0000	.0069
Mining	.0006	.0060	.0016	.0065	.0099	.0001	.0001	.0004
Construction	.0086	.0205	.0009	.0049	.0220	.0108	.0011	.0000
Manufacture	.1858	.0554	.3203	.3069	.1001	.0356	.0009	.2348
Trans&Trade	.0838	.0345	.1275	.0962	.1995	.0208	.0019	.2601
Services	.0947	.0721	.0769	.0605	.1708	.0775	.0008	.0172
Other	.0036	.0034	.0028	.0065	.0226	.0042	.0003	.0120
Employee Comp	.0964	.1054	.3479	.2406	.4605	.1413	.0065	.0047

Source: Tables 13 and 14.

TABLE 16

REGIONAL DIRECT REQUIREMENTS TABLE
WITH THREE EMPLOYEE CLASSES

	Agriculture	Mining	Construction	Manufacture	Transport	Services	Other	Local	Commuter	Relocator
Agriculture	.1687	.0000	.0017	.0219	.0008	.0016	.0000	.0069	.0000	.0069
Mining	.0006	.0060	.0016	.0065	.0099	.0001	.0001	.0004	.0000	.0004
Construction	.0086	.0205	.0009	.0049	.0220	.0108	.0011	.0000	.0000	.0000
Manufacture	.1858	.0554	.3203	.3069	.1001	.0356	.0009	.2348	.0000	.2348
Trans&Trade	.0838	.0345	.1275	.0962	.1995	.0208	.0019	.2601	.0000	.2601
Services	.0947	.0721	.0769	.0605	.1708	.0775	.0008	.0172	.0000	.0172
Other	.0036	.0034	.0028	.0065	.0226	.0042	.0003	.0120	.0000	.0120
Local workers	.0819	.0685	.2609	.2045	.3914	.1271	.0052	.0045	.0000	.0045
Commuters	.0145	.0264	.0696	.0241	.0461	.0071	.0010	.0002	.0000	.0002
Relocators	.0000	.0105	.0174	.0120	.0230	.0071	.0003	.0000	.0000	.0000

Source: Table 15 and text material.

residents and relocators. The assumption that commuters do not spend any portion of their earnings from employment within a Coastal Area is equally inaccurate, but it would be even more incorrect to assume that local expenditure patterns for commuters and residents are identical. Given the file editing capabilities of the SAM system, MMS personnel can correct this problem in the event that more detailed worker expenditures data by worker class become available.

The completion of Step Six results in a sector input coefficients table, more commonly referred to as the regional direct requirements table, that has been adjusted for regional trade patterns and, in the case of the MMS Study, that also has been expanded to show employee compensation/expenditures by worker class. Table 16 illustrates a regional direct requirements table.

To complete the regional I/O model, however, requires the derivation of one additional and important table. This table is the Leontief inverse matrix (i.e., the total requirements table), which is derived from the regional direct requirements table. More specifically, the total requirements table is derived by inverting the (I - A) matrix which is the identity matrix (in which all elements in the diagonal are 1 and all other elements are zero) minus the 'A' matrix of direct requirement coefficients. Output of each sector is then expressed as a function of the exogenous Final Demand. The total requirements table for our 8-sector illustration is given in Table 17, which was derived from Table 16 using the L-Inverse command of SAM. The L-Inverse command is discussed in the Command section of this manual.

Information from a total requirements table provides estimates of economic impact that are measured in terms of value of industry output. A column element of a total requirements table shows the total of direct and indirect changes in the output of sector i as sector j changes its sales to Final Demand by one dollar. For example, the column element of 0.8029 of the Construction column and Manufacture row of Table 17 means that output for the Manufacturing sector will change by $0.8029 (or about 80 cents) as a result of a one dollar change in sales to Final Demand by the Construction sector. The sum of the entries in each column of a Total Requirements table yields that column sector's output multiplier. For example, the output multiplier for the Construction sector of Table 17 is 3.4571. This output multiplier of 3.4571 for the Construction sector of Table 17 measures the total output (direct and indirect) required of the economy to support a one-dollar change in Final Demand of the Construction sector. Thus, to reiterate, the sum of each column of the Total Requirements table is the output multiplier for the sector named at the head of the column.

Output multipliers are typically measured in terms of value of production. Production value, however, can be converted to other measures of impact, such as employment effects, by using appropriate conversion factors, such as output per worker. For the MMS study, socioeconomic impacts were calculated in terms of sector output, income, employment, and population.

The (production-value) elements of a standard total requirements table, like Table 17, can be converted to employee compensation equivalences by multiplying each element times the corresponding sector employee compensation coefficient of the direct requirements table. This straightforward way of converting sector output units (value) to earnings (employee compensation) is presented in Table 18, where this table is the product of Table 17 and the last row (i.e., the employee compensation row) of Table 15. Although not shown here, an equally straightforward way can be used to convert employee compensation equivalences to full time employee equivalences.

What is required for this conversion is information on average earnings per employee by sector. The development of earnings data files for the MMS Coastal Areas is explained later in the discussion of the Input component of the SAM system.

Finally, for the MMS study, estimates of employment effects were converted to population estimates by using demographic statistics for the Coastal Areas. These demographic statistics are discussed next along with an explanation of the Demographic component of the SAM system (Figure Two).

II.B. The Demographic Component

Of special importance to the MMS study was the magnitude of population change resulting from OCS oil and gas activities and the age and sex composition of the new population.

In the SAM system (Figure Two), a Demographic component is linked to the Input-Output component to convert employment estimates from the Input-Output component to population estimates. It is important to note that the Demographic component is not actually a demographic model, but instead, it is a macro that makes use of 1) employment estimates from the Input-Output component; 2) certain available demographic statistics for coastal economies; and 3) the MACRO command of SAM. It is equally important to note that since the Demographic component is a macro, the way in which population is estimated can be changed by simply rewriting the macro. The Demographic component (macro) may need to be reformulated in future years in the event that more refined demographic statistics become available. The Demographic component (macro) of the SAM system is based on the current demographic statistics for Coastal Areas that are reported in Tables 19, 22, and 23. The development of the statistics reported in these tables needs to be discussed prior to an explanation of the Demographic component.

However, before turning to the demographic statistics, it is important to define worker types, which is a title used in the demographic tables. Worker types refer to the producing sectors that make-up the MMS I/O models for the MMS Coastal Areas. Recall that these models contain 116 producing sectors plus three employee sectors based on worker class. Based on the available demographic statistics for the MMS study, these 116 producing sectors were classified into the following worker types. These worker types are not to be confused with

the earlier defined worker classes (origins) of local, commuter, and relocator.

Direct Employment

On/Offshore Operations

I/O 17; Maintenance & Repair of Gas Utility Facilities
I/O 18; Maintenance & Repair of Petroleum Pipelines
I/O 19; Maintenance & Repair of Petroleum & Natural Gas Wells
I/O 39; Petroleum Refining
I/O 89; Pipeline, except Natural Gas

On/Offshore Construction

I/O 13; New Petroleum Pipelines
I/O 14; New Petroleum & Natural Gas Well Drilling
I/O 15; New Petroleum, Natural Gas & Solid Mineral Exploration

Indirect Employment

Type 1: (agriculture, forestry, fisheries, mining, construction, manufacturing, and transportation)

I/O Sectors: 1-12; 16; 20-38; 40-85

Type 2: (wholesale and retail trade, finance, insurance, real estate, services, and public administration)

I/O Sectors: 86-88; 90-116

The SAM system provides demographic impact estimates in terms of the above four categories of workers. In contrast, Tables 19, 22, and 23 contain certain demographic statistics for five worker types, two of which match the Types 1 and 2 under indirect employment. The remaining three worker types present in the table sequence had to be collapsed into the two direct employment categories above: On/Off Shore Operations and On/Off Shore Construction. The collapse was necessitated by the absence of a breakdown of the input-output sectors into offshore and onshore components. Standard values of the offshore worker type of Tables 19, 22, and 23 were assigned to the On/Off Shore Construction category while standard values of the onshore operations type were assigned to the On/Off Shore Operations category. This particular assignment of the standard values may be altered by the user of SAM, as described in Volume II of this report.

Support for the coefficients of Table 19 comes from information from all sites where the Year I study reported 50 or more offshore

TABLE 17

REGIONAL TOTAL REQUIREMENTS TABLE
WITH THREE EMPLOYEE CLASSES

	Agriculture	Mining	Construction	Manufacture	Transport	Services	Other	Local	Commuter	Relocator
Agriculture	1.2210	.0072	.0301	.0517	.0247	.0090	.0003	.0273	.0000	.0273
Mining	.0077	1.0088	.0122	.0159	.0203	.0027	.0002	.0096	.0000	.0096
Construction	.0230	.0262	1.0190	.0208	.0430	.0161	.0013	.0166	.0000	.0166
Manufacture	.5303	.1910	.8029	1.7388	.5728	.1727	.0068	.5666	.0000	.5666
Trans&Trade	.3286	.1412	.4976	.4160	1.6182	.1353	.0071	.5257	.0000	.5257
Services	.2308	.1243	.2470	.2104	.3611	1.1276	.0030	.1651	.0000	.1651
Other	.0211	.0110	.0289	.0290	.0524	.0120	1.0006	.0330	.0000	.0330
Local workers	.3748	.1876	.6628	.5587	.8152	.2379	.0102	1.3562	.0000	.3562
Commuters	.0492	.0406	.1159	.0653	.0951	.0198	.0016	.0412	1.0000	.0412
Relocators	.0160	.0175	.0407	.0325	.0476	.0135	.0006	.0205	.0000	1.0205

Source: Table 16.

TABLE 18

PRODUCING SECTOR TOTAL REQUIREMENTS
MEASURED AS EMPLOYMENT INCOME

	Agriculture	Mining	Construction	Manufacture	Transport	Services	Other
Agriculture	.1177	.0007	.0029	.0050	.0024	.0009	.0000
Mining	.0008	.1063	.0013	.0017	.0021	.0003	.0000
Construction	.0080	.0091	.3545	.0072	.0150	.0056	.0005
Manufacture	.1276	.0460	.1932	.4184	.1378	.0415	.0016
Trans&Trade	.1513	.0650	.2291	.1916	.7452	.0623	.0033
Services	.0326	.0176	.0349	.0297	.0510	.1593	.0004
Other	.0001	.0001	.0002	.0002	.0003	.0001	.0065

Source: Table 17 and text material.

TABLE 19

MMS DEMOGRAPHIC MODEL STANDARD VALUES AND SUGGESTED RANGES FOR USER ALTERATION, WORKER ORIGIN

Worker Type (1)	Worker Origin		
	Local (2)	Commuter (3)	Relocator (4)
Offshore Standard	.5	.4	.1
(Range)	(.2 -.8)	(.2-.7)	(.05-.3)
Offshore Operations Standard	.7	-	.3
(Range)	(.4-.9)	-	(.1-.6_
Onshore Construction Standard	.7	-	.3
(Range)	(.3-.9)	-	(.1-.4)
Secondary			
Type 1 Standard	.8	-	.2
(Range)	(.6-.9)	-	(.1-.4)
Type 2 Standard	.7	-	.3
(Range)	(.5-.9)	-	(.1-.5)

Source: Table 20.

TABLE 20

WORKERS BY PLACE OF RESIDENCE BY OFFSHORE STAGING AREA LOCATION, GULF OF MEXICO
(Major Offshore Sites Only)

Staging Area (1)	Offshore Workers			
	Total (2)	Within Area (3)	Commuters (4)	Percent Commuters (5)
Buras	122	96	26	21.3
Cameron	681	318	363	53.3
Freeport	386	102	284	73.6
Galveston	96	64	32	33.3
Grand Chenier	81	42	39	48.1
Grand Isle	778	277	501	64.4
Houma	501	133	368	73.4
Intracoastal City	799	351	448	56.1
Lake Charles	71	*	*	*
Leesville	318	105	213	67.0
Morgan City	2,736	1,470	1,266	46.3
Venice	1,018	664	354	34.8
TOTAL	7,587	3,622	3,894	52.4

* - Estimation procedure would result in an estimate of commuting workers exceeding 100 percent of the work force.

Source: Table 21 and Centaur Associates, Inc., Indicators of the direct economic impacts due to oil and gas development in the Gulf of Mexico, Volume II/Exhibits and data; Exhibit 2-26.

workers.[1] Inspection of Table 20, which provides information on commuters from the Year I study, indicates that considerable variability in the percentage of commuters existed among sites. The percentage of commuters averaged 52 percent but ranged from a low of 21 percent to values exceeding 70 percent. A word of caution is in order in interpreting Table 20, however, because of certain assumptions embodied in the estimation procedures. Because of the structure of the Year I report, producer employment for a specific staging area was much more readily allocated to places of residence than was offshore employment. To circumvent this problem, the offshore employment for each staging area was first estimated, where these estimates are given in the last column of Table 21. Then, Exhibit 2-26 of the Year I report was used as the basis for estimating the total number of commuters by staging area, which are reported in column 5 of Table 20. Since all commuters were assumed to be offshore workers, estimates of offshore commuters may contain a modest upward bias. Any such bias should be offset, however, by an opposite bias for the onshore workers.

In examining a specific development scenario and Coastal Area, an analyst might well decide to specify alternative values for the origin coefficients for offshore workers. Considerations to be weighed in determining such values include 1) local labor market conditions and 2) skills of local workers. Generally, the higher the local unemployment rate, the larger pool of unemployed persons, and the greater the similarity of the new jobs to those with which area residents are familiar, the higher will be the rate of local hiring. Other factors to consider include the perceived permanency of the new jobs and the availability of affordable accommodations near the staging area(s). When jobs are perceived as quite temporary or when housing is scarce, more workers may elect to commute rather than relocate to the job site.

While the Phase I report was quite helpful in identifying the extent of commuting, it was less useful in suggesting appropriate values for local hiring versus relocation. The Phase I worker data indicated the current residence of each worker, but it did not provide information concerning residential history. Therefore, estimates of local hiring and relocation were based on data reflecting experiences with similar projects in the Gulf Coast states or with OCS development in other areas[2]. The Phase I data base had similar limitations in addressing

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[1]Centaur Associates, Inc. 1986. Indicators of the direct economic impacts due to oil and gas development in the Gulf of Mexico. Minerals Management Service 86-0015.

[2]Murdock, S.H., S.S. Hwang, R.R. Hamm, and F.L. Leistritz. 1986. Project-related inmigration: Empirical evidence and policy implications. Paper presented at Conference on speculative migration and community impacts. St. Johns, Newfoundland: Memorial University.

House, J.D. 1985. The challenge of oil: Newfoundland's quest for controlled development. Social and economic studies series, No. 30. [St. Johns, Newfoundland]: Memorial University of Newfoundland, Institute of Social and Economic Research.

worker demographic profiles because it contained no information on worker's ages, marital status, number of dependents, or other demographic attributes.

Worker origin coefficients for other worker types were developed from a variety of sources which reflected recent experiences with similar types of projects in the Gulf Coast states, or in analogous areas[3]. The coefficients for onshore construction reflect the findings of Dunning in his survey of 51 construction projects of the Corps of Engineers, many of which were located in the Gulf Coast states. Coefficients for onshore operations reflect the fact that onshore work is often attractive to local workers and that many Gulf Coast areas have a relatively large labor force with skills and experience appropriate for work in oil and gas development. In general, slack labor market conditions, a large and skilled labor force, and scenarios specifying a low level of development would suggest using a higher local hiring rate than the standard. Conversely, if the labor market is tight and the labor pool small relative to the scale of the project, a lower rate than the standard would be appropriate.

Standard values and suggested ranges for key worker demographic attributes are summarized in Tables 22 and 23. Several key sources were used in estimating these coefficients.[4]

One item in Table 22 warrants special explanation. The "multiple jobholder adjustment factor" reflects the assumption that about one-half of the immigrating (relocating) secondary worker households will have two employed adults. While it is recognized that some of the households of relocating offshore, onshore operations, and onshore construction workers will also have two employed adults, a multiple jobholder adjustment factor is not applied to these worker types. The logic behind the decision not to employ an adjustment factor for these workers is that the number of relocating spouses who may be available for employment is often approximately offset by the number of locally hired construction and operations workers who represent jobs that have been vacated and must be refilled.

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[3]Halstead, J.M. and F.L. Leistritz. 1984. Energy development and labor market dynamics: A study of seven western counties. Western journal of agricultural economics, 9, pp. 357-369.

[4]Dunning, C.M. 1981. Report of survey of Corps of Engineers construction work force. Research report 81-R05. U.S. Army Corps of Engineers.

Halstead, J.M. and F.L. Leistritz. 1984. Energy development and labor market dynamics: A study of seven western counties. Western journal of agricultural economics, 9, pp. 357-369.

Murdock, S.H., S.S. Hwang, R.R. Hamm, and F.L. Leistritz. 1986. Project-related inmigration: Empirical evidence and policy implications. Paper presented at Conference on speculative migration and community impacts. St. Johns, Newfoundland: Memorial University.

TABLE 21

WORKERS BY OFFSHORE AND ONSHORE STATUS BY OFFSHORE STAGING AREA LOCATION, GULF OF MEXICO

Staging Area (1)	Total Employment (2)	Onshore Employment (3)	Offshore Employment (4)
Abbeville	98	98	0
Amelia	5	5	0
Baton Rouge	97	94	3
Baytown	30	30	0
Biloxi	6	6	0
Buras	148	26	122
Cameron	769	88	681
Cocodrie	13	13	0
Corpus Christi	17	14	3
Dallas	2	2	0
Dulac	17	17	0
Galveston	136	40	96
Grand Chenier	83	2	81
Grand Isle	894	116	778
Houma	531	30	501
Houston	301	301	0
Intracoastal City	819	20	799
La Habra Area	2	2	0
Lafayette	1,284	1,258	26
Lake Charles	219	148	71
Leesville	535	217	318
Mobile Area	8	4	4
Morgan City	3,569	833	2,736
New Orleans	10,203	10,203	0
Pensacola	6	6	0
Rodessa	18	18	0
Sabine Pass	81	81	0
Sulphur	4	4	0
Venice	1,384	371	1,018

Source: Centaur Associates, Inc., Indicators of the direct economic impacts due to oil and gas development in the Gulf of Mexico, Volume II/Exhibits and data; Exhibits 2-26 and 2-30.

TABLE 22

MMS DEMOGRAPHIC MODEL STANDARD VALUES AND SUGGESTED RANGES FOR USER ALTERATION, WORKER DEMOGRAPHIC ATTRIBUTES

Item (1)	Worker Type: Offshore Standard Value (Range) (2)	Onshore Operations Standard Value (Range) (3)	Onshore Construction Standard Value (Range) (4)	Secondary Type I Standard Value (Range) (5)	Secondary Type 2 Standard Value (Range) (6)
Percent of relocating workers who are male	.9 (.8-.95)	.8 (.75-.9)	.9 (.8-.95)	.6 (.5-.65)	.6 (.5-.65)
Percent of relocating workers who are married	.7 (.6-.8)	.8 (.7-.9)	.7 (.6-.8)	.7 (.6-.8)	.7 (.6-.8)
Percent of relocating workers with children	.6 (.5-.7)	.7 (.6-.8)	.6 (.5-.7)	.6 (.5-.7)	.6 (.5-.7)
Average number of children per relocating worker with children	1.2 (1.0-1.3)	1.4 (1.1-1.6)	1.3 (1.1-1.5)	1.4 (1.1-1.6)	1.4 (1.1-1.6)
Multiple jobholder adjustment factor	NA	NA	NA	1.5 (1.4-1.6)	1.5 (1.4-1.6)

NA - Not available
Source: Dunning (1981); Holstead and Leistritz (1984) and Murdock, et al., (1986).

TABLE 23

MMS DEMOGRAPHIC - SUGGESTED STANDARD VALUES
FOR AGE DISTRIBUTION BY WORKER TYPE

Item (1)	Worker Type				
	Offshore (2)	Onshore Operations (3)	Onshore Construction (4)	Secondary Type 1 (5)	Secondary Type 2 (6)
Age distribution of male inmigrants:					
20-24	24%	20%	24%	25%	25%
25-34	41	53	41	50	50
35-44	16	17	16	18	18
45-64	19	10	19	7	7
Age distribution of female inmigrants:					
20-24	24%	20%	24%	25%	25%
25-34	41	53	41	50	50
35-44	16	17	16	18	18
45-64	19	10	19	7	7
Age distribution of children:					
0- 5	35%	39%	35%	40%	40%
5-11	36	35	36	36	36
12-14	11	13	11	12	12
15-17	11	9	11	10	10
18-19	4	3	4	1	1
20-24	3	1	3	1	1

Source: Dunning (1081); Halstead and Leistritz (1984) and Murdock, et al., (1986).

STEP ONE: The first major step in the calculation of population estimates associated with OCS oil and gas activities was to estimate the total population for three population groups: female, male, and children. Later, as a second step, these three population groups were disaggregated on the basis of age distribution, using demographic statistics from Table 23.

Several assumptions were involved in the estimation of the female population group. The necessity of these assumptions reflects the nature of the demographic statistics presented in Tables 19 and 22. First, it was assumed that no one migrates unless the head of the household holds a job. Thus, single women migrate only if they have jobs. Furthermore, if a married woman is working, then her husband is also working. A second assumption involved the estimation of the percent of relocating women that are married. Since there was no information available for this demographic statistic for the Coastal Areas, it was assumed that the available statistic on the percent of relocating workers with dependents is equal to the number married. This assumption is not severe. Married women who have no dependents would be missed, but there is a high likelihood that these women work, since they have no children. These women would be counted as single.

The total female estimate is equal to:

$$\begin{bmatrix}\text{Number of}\\ \text{of}\\ \text{females}\end{bmatrix} = \begin{bmatrix}\text{Number of}\\ \text{married}\\ \text{females}\end{bmatrix} + \begin{bmatrix}\text{Number of}\\ \text{working}\\ \text{females}\end{bmatrix} - \begin{bmatrix}\text{Number of}\\ \text{working}\\ \text{married females}\end{bmatrix}$$

Where:

$$\begin{bmatrix}\text{Number of}\\ \text{married}\\ \text{females}\end{bmatrix} = \begin{bmatrix}\%\text{ of relocators}\\ \text{that are}\\ \text{married women}\end{bmatrix} \times \begin{bmatrix}\text{number}\\ \text{of}\\ \text{relocators}\end{bmatrix}$$

$$= \begin{bmatrix}\%\text{ of relocators}\\ \text{that are}\\ \text{married men}\end{bmatrix} \times \begin{bmatrix}\text{number}\\ \text{of}\\ \text{relocators}\end{bmatrix}$$

$$= \begin{bmatrix}\text{percent}\\ \text{male}\\ \text{relocators}\end{bmatrix} \times \begin{bmatrix}\%\text{ relocators}\\ \text{with}\\ \text{dependents}\end{bmatrix} \times \begin{bmatrix}\text{number}\\ \text{of}\\ \text{relocators}\end{bmatrix}$$

$$\begin{bmatrix}\text{Number of}\\ \text{working}\\ \text{females}\end{bmatrix} = \begin{bmatrix}\%\text{ of relocators}\\ \text{that are}\\ \text{women}\end{bmatrix} \times \begin{bmatrix}\text{number}\\ \text{of}\\ \text{relocators}\end{bmatrix}$$

$$= \left[\begin{array}{c}1 - \% \text{ relocators} \\ \text{that are} \\ \text{men}\end{array}\right] \times \left[\begin{array}{c}\text{number} \\ \text{of} \\ \text{relocators}\end{array}\right]$$

$$\begin{array}{r}\text{Number of} \\ \text{married} \\ \text{working females}\end{array} = \left[\begin{array}{c}\% \text{ of relocators} \\ \text{that are} \\ \text{working females}\end{array}\right] \times \left[\begin{array}{c}\% \text{ relocating} \\ \text{with} \\ \text{children}\end{array}\right] \times \left[\begin{array}{c}\text{number} \\ \text{of} \\ \text{relocators}\end{array}\right]$$

$$= \left[\begin{array}{c}1 - \% \text{ relocators} \\ \text{that are} \\ \text{male}\end{array}\right] \times \left[\begin{array}{c}\% \text{ relocating} \\ \text{with} \\ \text{children}\end{array}\right] \times \left[\begin{array}{c}\text{number} \\ \text{of} \\ \text{relocators}\end{array}\right]$$

Based on the data of Tables 19 and 22 and the assumptions stated earlier, the following substitutions were made:

% male = % relocators that are male

% children = % relocators with dependents

A more straightforward procedure was used to estimate the male populations for the Coastal Areas. These estimates were based on the following equation. Again, this equation reflects the data given in Tables 19 and 22.

$$\begin{array}{c}\text{estimated} \\ \text{male} \\ \text{population}\end{array} = \left[\begin{array}{c}\text{number} \\ \text{of} \\ \text{relocators}\end{array}\right] \times \left[\begin{array}{c}\text{percent} \\ \text{that are} \\ \text{male}\end{array}\right]$$

An equally straightforward way was used to estimate the number of children associated with working relocators. The equation developed in the macro of the SAM system is indicated below.

$$\begin{array}{c}\text{number} \\ \text{of} \\ \text{children}\end{array} = \left[\begin{array}{c}\text{average number of} \\ \text{children per relocating} \\ \text{with dependents}\end{array}\right] \times \left[\begin{array}{c}\text{number of} \\ \text{relocating} \\ \text{workers}\end{array}\right]$$

STEP TWO: The second major step involved the development of the age distribution for the female, male, and children populations, respectively. Using the age distributions of Table 23, the population

estimates of Step One were disaggregated on the basis of the corresponding age distributions given in this table.

II.C. The Data Base Component

The Input component of the SAM system (Figure Two) contains all the data files used 1) to construct the Coastal Area I/O models and 2) to derive the socioeconomic impacts, which are measured in terms of industry output, income, employment, and population. These data files are generated in two ways. Some are generated from external data sources; others are generated within the SAM system. These two kinds of files will be referred to as external files and interval files, respectively. All data files are listed below:

External Files

- The CBP4__.DAT Files
- The AGCROPS.PRN File
- The AGWAGE.DAT File
- The MAKE.DAT File
- The USE.DAT File
- The DEMOGF__.PRN Files
- The GULFPRC.DAT File

Internal Files

- The AREA__.DAT Files
- The LQ__.DAT Files
- The GULFIMP.DAT File
- The REGION__.DAT Files
- The REGION__.TOT Files

Discussion begins with the external files, since these files were used to generate the internal files.

II.C.1. External Files

II.C.1.a. The CBP4__.DAT Files (CBP Files)

The CBP files, named after County Business Patterns data which are published by the Bureau of the Census of the U.S. Department of Commerce, are the primary source files for employment and earnings information for the SAM system. There are 11 CBP files where the first ten files named below represent the ten MMS Coastal Areas. The 11th file represents U.S. totals. The CBP files for the Coastal Areas were created from the 1983 County Business Patterns data tape. The CBP file for the U.S., which will be explained later, was created by "hand entering" data from a County Business Pattern U.S. Summary Report for 1983.

File Name	Description
CBP4E1.DAT	Coastal Area E1 (Florida counties)
CBP4E2.DAT	Coastal Area E2 (Florida counties)
CBP4E3.DAT	Coastal Area E3 (Florida counties)
CBP4E4.DAT	Coastal Area E4 (Florida counties)
CBP4C1.DAT	Coastal Area C1 (Louisiana parishes)
CBP4C2.DAT	Coastal Area C2 (Louisiana parishes)
CBP4C3.DAT	Coastal Area C3 (Louisiana parishes)
CBP4C4.DAT	Coastal Area C4 (Mississippi and Alabama counties)
CBP4W1.DAT	Coastal Area W1 (Texas counties)
CBP4W2.DAT	Coastal Area W2 (Texas counties)
CBP4US2.DAT	U.S. Totals (United States)

It is important to understand that the creation of the CBP files is outside the SAM system, meaning that this is the responsibility of the analyst. As a word of caution, a certain format style, explained below, must be followed in creating these files, since they are input files to the SAM system.

Since the CBP files for the Coastal Areas were developed from a data tape, experience in data tape management is required. While the following explanation of how the Coastal Area CBP files were developed is based on the 1983 County Business Pattern data tape, there is no guarantee that this explanation will be entirely correct for a later data tape. However, this explanation should still prove quite useful even if the data tape format is changed for a later year, particularly since instructions accompany the tape. To this end, the construction and format of one of the ten CBP Coastal Area files, CBP4C1.DAT, will be explained. Generalization to the other nine Coastal Area CBP files will then follow.

The CBP4C1.DAT file (and the other nine CBP4__.DAT files) were created from data on the "File number 2" 1983 County Business Patterns data tape, which is available from the Bureau of the Census, U.S. Department of Commerce. This tape contains both published and unpublished data on employees, wages, and business sizes for 1-, 2-, 3-, and 4-digit SIC industries in the respective counties/parishes of the United States. For convenience, this tape will be referred to as the CBP data tape.

The 1983 CBP data tape which was used to create the ten CBP4__.DAT files is segmented into tape files that correspond to Census regions. Florida counties reside in tape file number 5, Mississippi and Alabama counties reside in tape file number 6, and Texas and Louisiana counties/parishes reside in tape file number 7. (The counties/parishes and identifying codes are listed on later pages.) As indicated earlier, there is no guarantee that the CBP data tape will retain this same segmentation in future years. Technical manuals, however, accompany the tape when it is purchased. Further details concerning the tape and its procurement are noted in Exhibit One, which was copied from a County Business Patterns publication. An order form is also included as Exhibit Two for convenience.

FIGURE FIVE

AGRICULTURE DIRECTORY

I/O Sector	I/O Sector Description	Agriculture Census Commodity(ies)
1.0100	Dairy Farm Products	Dairy Products
1.0200	Poultry and Eggs	Poultry & Poultry Products
1.0301	Meat Animals	Cattle & Calves; Hogs & Pigs; Sheep, Lambs, & Wool
1.0301	Misc. Livestock	Other Livestock & Livestock Products
2.0100	Cotton	Cotton & Cottonseed
2.0201	Food Grains	Corn for Grain; Wheat; Soybeans
2.0202	Feed Grains	Corn for Grain; Sorghum for Grain; Oats, Other Grain
2.0203	Grass Seeds	Hay, Silage, & Field Seeds
2.0300	Tobacco	Tobacco
2.0401	Fruits	Fruits, Nuts, & Berries
2.0402	Tree Nuts	Fruits, Nuts, & Berries
2.0501	Vegetables	Vegetables, Sweet Corn, & Melons
2.0502	Sugar Crops	Other Crops
2.0503	Misc. Crops	Other Crops
2.0600	Oil Bearing Crops	Other Crops
2.0701	Forest Products	(Not an Agric. Census category; set value = 0.)
2.0702	Greenhouse & Nursery Products	Nursery & Greenhouse Products

Source: Appendix B and U.S. Department of Agriculture, 1982 census of agriculture. [Washington D.C.]: U.S. Government Printing Office.

The contents of each record in the CBP data tape are given in Exhibit Three, which was copied from the technical manual that accompanied the 1983 CBP data tape. Names of the variables on the tape are given under the "Name" heading. Widths of the variables are given under the "Size/Scale" heading. The record column in which the variables begin are given under the "Begin" heading. The type of data, numeric or alphanumeric, is indicated by either an N or A under the "Data Type" column.

All the records (industries) for all the parishes in Coastal Area C1 must be selected from the CBP data tape and a subset of variables that are on the records must be written to a file on the Perkin-Elmer system. The resulting file must be named CBP4C1.DAT since this name is expected by the SAM system. Selection of the records for all the parishes in Coastal Area C1 may be accomplished by a search through the CBP data tape using the variables FIPSTATE and FIPSCTY2 which together form a five column field (columns 140-144) that are referred to as the FIPS code. Conditional statements can be used to select records from the CBP data tape when columns 140-144 equal the FIPS codes of any of the Coastal Area C1 parishes. The FIPS codes of all counties/parishes in the ten Coastal Areas are given in Exhibit Three. The necessary subset of variables and their column numbers when written to CBP4C1.DAT are:

Variable Names			Variable Description
FIPSTATE	:	1-2	(census state code)
FIPSCTY2	:	3-5	(census county code)
SICCODE2	:	7-10	(SIC code)
TEMPMM	:	13-24	(total mid-March employees)
TPAYQ1	:	26-37	(total 1st. qtr. payroll - $thous)
TANPAY	:	39-50	(total annual payroll - $thous)
CTYEMP1	:	52-57	(no. of estab. with 1-4 employees)
CTYEMP2	:	59=63	(no. of estab. with 5-9 employees)
CTYEMP3	:	65-69	(no. of estab. with 10-19 employees)
CTYEMP4	:	71-74	(no. of estab. with 20-49 employees)
CTYEMP5	:	76-78	(no. of estab. with 50-99 employees)
CTYEMP6	:	80-82	(no. of estab. with 100-249 employees)
CTYEMP7	:	84-86	(no. of estab. with 250-499 employees)
CTYEMP8	:	88-90	(no. of estab. with 500-999 employees)
CTYEMP9	:	92-94	(no. of estab. with 1000-or more employ.)
CTYEMP10	:	96-98	(no. of estab. with 1000-1499 employees)
CTYEMP11	:	100-102	(no. of estab. with 1500-2499 employees)
CTYEMP12	:	104-106	(no. of estab. with 2500-4999 employees)
CTYEMP13	:	108-110	(no. of estab. with 5000 or more employ.)

With the exception of the first two variables listed above, the remaining subset corresponds to the format followed in the County Business Patterns (CBP) reports. For convenience, a page, Exhibit Four, has been copied form a CBP report. Notice in Exhibit Four that in several cases, letters appear in place of numbers, reflecting disclosure problems. The same lettering system is used on the CBP data tape. The SAM system contains a program, called CBP.FTN, that converts these

tabulation of the data to minimize the effects of nonsampling errors.

Estimating techniques are used for data records which failed computer edits or had incomplete reporting of data items and for employers who reported too late to be included in the tabulations. (See "Definitions of Basic Data Items" for a general explanation of the imputation methodologies.)

Details in the tables may not add to totals because (1) some establishment records are not classified to the most detailed SIC level and (2) summary records with less than 50 employees are not shown separately but are shown at the next broader SIC group. Detailed payroll figures may not add to totals because of independent rounding.

IMPUTATION METHODOLOGY

The data user should keep in mind that the imputation methodology was identical to the methodology used in 1978. Please refer to the 1978 U.S. Summary publication for a description of the methodologies used as well as estimates of the levels of imputation for the various data items, which are approximately the same as published in 1978.

Inquiries on the effect of imputed data on published data totals of the U.S. level should be directed to:

Chief, Economic Surveys Division
Bureau of the Census
Washington, D.C. 20233

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in this publication:

	Zero
n.e.c.	Not elsewhere classified
SIC	Standard Industrial Classification
D	Withheld to avoid disclosing figures for individual companies
A-C, E-M	Entered in place of employment data, represents an employment-size class as shown at the bottom of the page

COUNTY BUSINESS PATTERNS DATA AVAILABLE ON COMPUTER TAPES

The published and unpublished County Business Patterns data are available on computer tapes. The tapes provide data on mid-March employment, first-quarter payroll, annual payroll, total number of establishments, and number of establishments by employment-size class by State and by county to the four-digit SIC level. Data for SIC's with fewer than 50 employees in a given county do not appear in the State and national County Business Patterns publications, but there is no such restriction on the tapes that include unpublished data. Of course, specific employment and payroll figures are withheld if the data might disclose information about individual employers. Nonetheless, the number of establishments by employment-size class by four-digit SIC by county is available without exception. Tables providing data other than the basic county and state SIC summary data are not available on tape. Two types of files will be available: one containing all of the data, both published and unpublished, for all States and counties, and another limited to the data in print for all States and counties. The U.S. Summary data tapes containing either published or unpublished data reflect the latest data corrections available at the time of their release, which may not match the previously released State totals. The price per tape is currently $140, documentation included. Prepayment is required.

Published and Unpublished Data.

Number of reels	File number	Description
4	2	County data by census geographic State code and FIPS county code, by SIC code.
1	1B	State data by census geographic State code, by SIC code.
1	US	U.S. Summary and data by census geographic State code, by SIC Code

Inquiries for data years 1974 through 1983 should be addressed to:

Customer Services Branch
Data User Services Division
Bureau of the Census
Washington, D.C. 20233

COUNTY BUSINESS PATTERNS DATA AVAILABLE ON FLOPPY DISKETTES AND MICROFICHE

County Business patterns data are now available on flexible diskettes. The diskettes provide data on employment, annual payroll, total number of establishments and number of establishments by employment-size class by State and county to the two-digit SIC level. Data are available for the United States, 50 States, District of Columbia, and counties throughout the United States. Files are available on 5¼" flexible disks in IBM PC format.

County Business Patterns data are also available on microfiche. This is primarily for past publications (which are out of print), but microfiche is also available for current year data. Each microfiche is estimated to contain 98 pages on one microfiche. Inquiries on the fees for flexible diskettes and microfiche should be addressed to:

Customer Services Branch
Data User Services Division
Bureau of the Census
Washington, D.C. 20233

GPO Order Form (Publications)

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*One copy of the Technical Documentation is sent at no extra charge with tape orders.

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☐ 9 track, 1600 bpi, ASCII ☐ 9 track, 6250 bpi, ASCII

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EXHIBIT THREE

CBPCNTY DATA DICTIONARY

RECORD 01

NAME	SIZE/ SCALE	BEGIN	DATA TYPE	
				54 VIRGINIA 91 WASHINGTON 55 WEST VIRGINIA 35 WISCONSIN 83 WYOMING 98 OVERSEAS EMPLOYERS OF U.S. ESTABLISHMENT 99 MERCHANT MARINES (AT SEA)
COUNTY2	3	3	N	CENSUS COUNTY CODE
FILL1	1	6	A	FILLER 1
SICCODE2	4	7	N	SIC CODE SEE APPENDIX C
FILL2	1	11	A	FILLER 2
FLAG	1	12	A	DATA SUPPRESSION FLAG - TOTALS THIS DENOTES EMPLOYMENT SIZE CLASS FOR DATA WITHHELD TO AVOID DISCLOSURE. EMPLOYMENT AND PAYROLL DATA ARE REPLACED BY ZEROES.
				A 0-19 B 20-99 C 100-249 E 250-499 F 500-999 G 1000-2499 H 2500-4999 I 5000-9999 J 10,000-24,999 K 25,000-49,999 L 50,000-99,999 M 100,000 OR MORE
TEMPMM	12	13	N	TOTAL MID-MARCH EMPLOYEES

EXHIBIT THREE

CBPCNTY DATA DICTIONARY

RECORD 01

NAME	SIZE/ SCALE	BEGIN	DATA TYPE	
STATE2	2	1	N	CENSUS STATE CODE
			63	ALABAMA
			94	ALASKA
			86	ARIZONA
			71	ARKANSAS
			93	CALIFORNIA
			84	COLORADO
			16	CONNECTICUT
			51	DELAWARE
			53	DISTRICT OF COLUMBIA
			59	FLORIDA
			58	GEORGIA
			95	HAWAII
			82	IDAHO
			33	ILLINOIS
			32	INDIANA
			42	IOWA
			47	KANSAS
			61	KENTUCKY
			72	LOUISIANA
			11	MAINE
			52	MARYLAND
			14	MASSACHUSETTS
			34	MICHIGAN
			41	MINNESOTA
			64	MISSISSIPPI
			43	MISSOURI
			81	MONTANA
			46	NEBRASKA
			88	NEVADA
			12	NEW HAMPSHIRE
			22	NEW JERSEY
			85	NEW MEXICO
			21	NEW YORK
			56	NORTH CAROLINA
			44	NORTH DAKOTA
			31	OHIO
			73	OKLAHOMA
			92	OREGON
			23	PENNSYLVANIA
			15	RHODE ISLAND
			57	SOUTH CAROLINA
			45	SOUTH DAKOTA
			62	TENNESSEE
			74	TEXAS
			87	UTAH
			13	VERMONT

EXHIBIT THREE

CBPCNTY DATA DICTIONARY

RECORD 01

NAME	SIZE/ SCALE	BEGIN	DATA TYPE	
TPAYQ1	12	25	N	TOTAL FIRST QTR. PAYROLL ($THOUS)
TANPAY	12	37	N	TOTAL ANNUAL PAYROLL ($THOUS)
TESTAB	6	49	N	TOTAL NO. OF ESTABLISHMENTS
CTYEMP1	6	55	N	NO. OF ESTABLISHMENTS BY EMPLOYMENT SIZE CLASS: CLASS SIZE 1-4 EMPLOYEES
CTYEMP2	6	61	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE: 5-9 EMPLOYEES
CTYEMP3	6	67	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE: 10-19 EMPLOYEES
CTYEMP4	6	73	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE 20-49 EMPLOYEES
CTYEMP5	6	79	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE: 50-99 EMPLOYEES
CTYEMP6	6	85	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE 100-249 EMPLOYEES
CTYEMP7	6	91	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE 250-499 EMPLOYEES

EXHIBIT THREE

RECORD 01

NAME	SIZE/ SCALE	BEGIN	DATA TYPE	
CTYEMP8	6	97	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE 500-999 EMPLOYEES
CTYEMP9	6	103	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE 1000 OR MORE EMPLOYEES
CTYEMP10	6	109	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE: 1000-1499 EMPLOYEES
CTYEMP11	6	115	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE: 1500-2499 EMPLOYEES
CTYEMP12	6	121	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE: 2500-4999 EMPLOYEES
CTYEMP13	6	127	N	NO. OF ESTABLISHMENTS: EMPLOYMENT CLASS SIZE: 5000 AND MORE EMPLOYEES
FILL3	1	133	A	FILLER 3
SSASTAT2	2	134	N	SSA STATE CODE
SSACTY2	3	136	N	SSA COUNTY CODE
FILL4	1	139	A	FILLER 4
FIPSTATE	2	140	N	FIPS STATE CODE

EXHIBIT THREE

CBPCNTY Data DICTIONARY

RECORD 01

NAME	SIZE/ SCALE	BEGIN	DATA TYPE	
			1	ALABAMA
			2	ALASKA
			4	ARIZONA
			5	ARKANSAS
			6	CALIFORNIA
			8	COLORADO
			9	CONNECTICUT
			10	DELAWARE
			11	DISTRICT OF COLUMBIA
			12	FLORIDA
			13	GEORGIA
			15	HAWAII
			16	IDAHO
			17	ILLINOIS
			18	INDIANA
			19	IOWA
			20	KANSAS
			21	KENTUCKY
			22	LOUISIANA
			23	MAINE
			24	MARYLAND
			25	MASSACHUSETTS
			26	MICHIGAN
			27	MINNESOTA
			28	MISSISSIPPI
			29	MISSOURI
			30	MONTANA
			31	NEBRASKA
			32	NEVADA
			33	NEW HAMPSHIRE
			34	NEW JERSEY
			35	NEW MEXICO
			36	NEW YORK
			37	NORTH CAROLINA
			38	NORTH DAKOTA
			39	OHIO
			40	OKLAHOMA
			41	OREGON
			42	PENNSYLVANIA
			44	RHODE ISLAND
			45	SOUTH CAROLINA
			46	SOUTH DAKOTA
			47	TENNESSEE
			48	TEXAS
			49	UTAH
			50	VERMONT
			51	VIRGINIA
			53	WASHINGTON

EXHIBIT THREE

RECORD 01

NAME	SIZE/ SCALE	BEGIN	DATA TYPE	
			54	WEST VIRGINIA
			55	WISCONSIN
			56	WYOMING
FIPSCTY2	3	142	N	FIPS COUNTY CODE
FILL5	6	145	A	FILLER 5

Table 2. Counties--Employees, Payroll, and Establishments, by Industry: 1983—Continued

(Excludes government employees, railroad employees, self-employed persons, etc.—see "General Explanation" for definitions and statement on reliability of data. Size class 1 to 4 includes establishments having payroll but no employees during mid-March pay period. "D" denotes figures withheld to avoid disclosure of operations of individual establishments, the other alphabetics indicate employment-size class—see footnote.)

SIC code	Industry	Number of employees for week including March 12	Payroll ($1,000)		Number of establishments, by employment-size class									
			First Quarter	Annual	Total	1 to 4	5 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1000 or more
	HUTCHINSON—Continued													
594	Miscellaneous shopping goods stores	56	110	526	12	8	3	1	-	-	-	-	-	-
....	Finance,insurance,and real estate	301	1 119	4 799	43	30	6	4	2	1	-	-	-	-
60	Banking	146	637	2 702	4	-	-	2	1	1	-	-	-	-
602	Commercial and stock savings banks	146	637	2 702	4	-	-	2	1	1	-	-	-	-
61	Credit agencies other than banks	56	184	883	9	7	1	-	1	-	-	-	-	-
....	Services	1 099	3 602	13 646	156	93	41	12	9	-	1	-	-	-
70	Hotels and other lodging places	68	106	401	9	5	2	1	1	-	-	-	-	-
701	Hotels, motels, and tourist courts	(B)	(D)	(D)	8	4	2	1	1	-	-	-	-	-
72	Personal services	94	240	843	19	12	5	1	1	-	-	-	-	-
73	Business services	143	670	2 292	19	11	4	2	2	-	-	-	-	-
734	Services to buildings	(B)	(D)	(D)	5	2	1	1	1	-	-	-	-	-
739	Miscellaneous business services	(B)	(D)	(D)	12	7	3	1	1	-	-	-	-	-
76	Miscellaneous repair services	50	181	664	11	7	2	2	-	-	-	-	-	-
79	Amusement & recreation services	58	101	532	5	3	-	-	2	-	-	-	-	-
80	Health services	216	773	3 091	31	15	12	2	2	-	-	-	-	-
801	Offices of physicians	73	368	1 479	14	7	5	2	-	-	-	-	-	-
805	Nursing and personal care facilities	(B)	(D)	(D)	2	-	-	-	2	-	-	-	-	-
83	Social services	53	84	344	9	5	3	1	-	-	-	-	-	-
86	Membership organizations	94	132	591	15	9	3	2	1	-	-	-	-	-
866	Religious organizations	76	81	401	8	3	2	2	1	-	-	-	-	-
89	Miscellaneous services	246	1 110	4 225	12	5	6	-	-	-	1	-	-	-
891	Engineering & architectural services	(C)	(D)	(D)	1	-	-	-	-	-	1	-	-	-
....	Nonclassifiable establishments	60	121	819	53	49	3	1	-	-	-	-	-	-
	IRION													
	Total	297	1 240	5 241	35	18	5	9	2	1	-	-	-	-
....	Mining	85	587	2 405	7	3	2	1	-	1	-	-	-	-
13	Oil and gas extraction	85	587	2 405	7	3	2	1	-	1	-	-	-	-
132	Natural gas liquids	(B)	(D)	(D)	3	1	1	-	-	1	-	-	-	-
....	Contract construction	55	106	441	7	3	-	4	-	-	-	-	-	-
....	Transportation and other public utilities	(B)	(D)	(D)	2	1	-	-	-	-	-	-	-	-
....	Wholesale trade	29	134	545	3	1	-	1	-	-	-	-	-	-
....	Retail trade	30	82	352	9	5	3	1	-	-	-	-	-	-
....	Finance,insurance,and real estate	(A)	(D)	(D)	1	-	-	1		-	-	-	-	-
....	Services	(A)	(D)	(D)	2	1	-	1	-	-	-	-	-	-
....	Nonclassifiable establishments	1	-	37	4	4	-	-	-	-	-	-	-	-
	JACK													
	Total	1 290	4 137	16 940	191	120	37	17	14	3	-	-	-	-
....	Agricultural services,forestry,fisheries	(A)	(D)	(D)	1	1	-	-	-	-	-	-	-	-
....	Mining	330	1 309	5 170	30	15	4	5	5	1	-	-	-	-
13	Oil and gas extraction	(E)	(D)	(D)	29	15	4	4	5	1	-	-	-	-
138	Oil and gas field services	306	1 179	4 753	23	10	3	4	5	1	-	-	-	-
1381	Drilling oil and gas wells	150	624	2 734	10	3	1	2	4	-	-	-	-	-
1389	Oil and gas field services, nec	(C)	(D)	(D)	9	5	2	-	1	1	-	-	-	-
....	Contract construction	44	197	739	17	12	5	-	-	-	-	-	-	-
....	Manufacturing	(B)	(D)	(D)	4	2	-	1	-	1	-	-	-	-
34	Fabricated metal products	(B)	(D)	(D)	2	1	-	-	-	1	-	-	-	-
344	Fabricated structural metal products	(B)	(D)	(D)	2	1	-	-	-	1	-	-	-	-
3443	Fabricated plate work (boiler shops)	(B)	(D)	(D)	1	-	-	-	-	1	-	-	-	-
....	Transportation and other public utilities	79	383	1 673	11	5	3	2	1	-	-	-	-	-
....	Wholesale trade	116	507	2 068	10	6	2	-	1	1	-	-	-	-
50	Wholesale trade-durable goods	(B)	(D)	(D)	5	3	1	-	1	-	-	-	-	-
508	Machinery, equipment, and supplies	(B)	(D)	(D)	4	2	1	-	1	-	-	-	-	-
51	Wholesale trade-nondurable goods	(B)	(D)	(D)	5	3	1	-	-	1	-	-	-	-
517	Petroleum and petroleum products	(B)	(D)	(D)	2	1	-	-	-	1	-	-	-	-
5171	Petroleum bulk stations & terminals	(B)	(D)	(D)	1	-	-	-	-	1	-	-	-	-
....	Retail trade	361	651	2 762	56	34	12	9	3	-	-	-	-	-
54	Food stores	74	149	600	8	2	4	1	1	-	-	-	-	-
541	Grocery stores	(B)	(D)	(D)	7	2	3	1	1	-	-	-	-	-
58	Eating and drinking places	121	153	707	11	5	-	4	2	-	-	-	-	-
5812	Eating places	(C)	(D)	(D)	10	4	-	4	2	-	-	-	-	-
59	Miscellaneous retail	59	105	451	11	8	1	2	-	-	-	-	-	-
....	Finance,insurance,and real estate	83	286	1 341	13	9	2	-	2	-	-	-	-	-
60	Banking	58	214	1 005	3	-	1	-	2	-	-	-	-	-
602	Commercial and stock savings banks	58	214	1 005	3	-	1	-	2	-	-	-	-	-
....	Services	177	374	1 437	38	29	7	-	2	-	-	-	-	-
80	Health services	89	184	646	10	7	1	-	2	-	-	-	-	-
805	Nursing and personal care facilities	(B)	(D)	(D)	3	1	-	-	2	-	-	-	-	-
....	Nonclassifiable establishments	(A)	(D)	(D)	9	7	2	-	-	-	-	-	-	-
	JACKSON													
	Total	2 262	8 753	28 311	332	217	66	28	19	5	1	-	-	-
....	Agricultural services,forestry,fisheries	(B)	(D)	(D)	11	9	-	2	-	-	-	-	-	-
....	Mining	296	1 348	5 596	12	3	2	2	4	1	-	-	-	-
13	Oil and gas extraction	296	1 348	5 596	12	3	2	2	4	1	-	-	-	-
138	Oil and gas field services	237	1 025	4 252	9	2	2	1	3	1	-	-	-	-

A:0-19; B:20-99; C:100-249; E:250-499; F:500-999; G:1,000-2499; H:2,500-4,999; I:5,000-9,999; J:10,000-24,999; K:25,000-49,999; L:50,000-99,999; M:100,000 or more.

letters to numeric values. This program and its use is explained later in the Internal Data section.

The other nine CBP4__.DAT files indicated in the above list are constructed by replicating the procedures outlined above for the example file CBP4C1.DAT. The necessary subset of variables and column numbers to be used are identical to the lists given for CBP4C1.DAT above.

The CBP4US2.DAT file is constructed by entering data from the publication "County Business Patterns - United States: Employment and Payrolls, Number and Employment Size of Establishments by Detailed Industry" issued on an annual basis by the Bureau of the Census, U.S. Department of Commerce. The file must contain three variables per record. The variables and their columns on each record are:

Industry SIC Code	:	7 - 10 (alphanumeric)
Industry Number of Employees	:	11 - 21 (numeric)
Industry Payroll, Annual	:	25 - 38 (numeric)

Values of the first variable in the file, Industry SIC Code, must <u>not</u> be altered under any circumstances. Doing so will create errors in the SAM system. There must be exactly 1148 SIC categories (variables) in this file. The 1148 SIC categories are listed in Appendix E. Only the other two variables should be updated when a new set of annual U.S. data become available. When updating the file, do not be concerned if the number of employees and/or payroll number in the industry is zero. If there are no employees and/or payroll number in the U.S. data for a particular industry present in the list of SIC codes, simply enter zeros but do not erase the SIC code number that begins the records. Again, tampering with the SIC Code variable will cause the SAM system to malfunction.

The data on the Number of Employees and Payroll variables for 1983 were taken from Table 1B of the above referenced publication. Exhibit Five is a page that was copied from Table 1B.

II.C.1.b. The AGCROPS.PRN File

The AGCROPS.PRN file, which contains gross farm marketings by farm commodity, is used to fill a gap in County Business Patterns data. In short, CBP data records do not include information on agricultural earnings and employment. As noted earlier, employment and earnings information is used in the SAM system to construct the Coastal Area I/O models and, in turn, to calculate socioeconomic impacts for the Coastal Areas.

However, in the development of the I/O models other measures of economic activity, like industry gross receipts, can be used in place of employment data. What is actually required is some measure of the <u>level</u> of industry activity. Thus, gross farm marketings provide a satisfactory substitute for employment data.

Table 1B. United States—Establishments, Employees, and Payroll by Industry by Employment-Size Class: 1983—Continued

(Excludes government employees, railroad employees, self-employed persons, etc.—see "General Explanation" for definitions and statement on reliability of data. Size class 1 to 4 include establishments having payroll but no employees during mid-March pay period. "D" denotes figures withheld to avoid disclosure of operations of individual establishments, the other alphabetics indicate employment-size class—see footnote.)

SIC code	Industry	Employment size class								
		Total	1 to 4	5 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500 to 999
3322	Malleable iron foundries									
	Number of establishments	44	7	3	3	7	6	12	4	1
	Number of employees	6 261	17	(D)	52	241	436	1 677	1 273	(D)
	Payroll, first quarter ($1000)	30 461	43	(D)	358	1 118	1 313	7 600	4 544	(D)
	Payroll, annual ($1000)	136 936	217	(D)	913	4 913	5 937	33 442	20 392	(D)
3324	Steel investment foundries									
	Number of establishments	133	10	4	23	27	28	26	8	6
	Number of employees	15 698	15	(D)	316	891	2 052	4 310	2 652	(D)
	Payroll, first quarter ($1000)	81 271	58	(D)	1 360	3 625	8 627	19 423	14 523	(D)
	Payroll, annual ($1000)	317 219	706	(D)	5 526	16 380	35 714	82 375	51 640	(D)
3325	Steel foundries, nec									
	Number of establishments	306	42	30	42	66	45	59	20	4
	Number of employees	25 132	92	209	644	2 124	3 053	9 712	7 023	2 275
	Payroll, first quarter ($1000)	127 344	391	816	3 378	10 527	14 731	50 973	36 780	9 749
	Payroll, annual ($1000)	533 345	2 377	3 549	14 310	42 931	60 646	208 599	156 328	44 600
333	Primary nonferrous metals									
	Number of establishments	188	48	20	15	21	11	16	27	23
	Number of employees	39 226	95	146	186	659	774	2 729	10 091	16 339
	Payroll, first quarter ($1000)	312 222	451	834	800	3 553	5 287	17 860	85 276	120 927
	Payroll, annual ($1000)	1 229 910	2 876	2 819	3 505	14 053	23 010	66 882	322 481	501 429
3331	Primary copper									
	Number of establishments	24	1	1	-	3	-	5	7	7
	Number of employees	8 002	(D)	(D)	-	(D)	-	(D)	2 662	4 275
	Payroll, first quarter ($1000)	58 553	(D)	(D)	-	(D)	-	(D)	21 355	28 938
	Payroll, annual ($1000)	196 216	(D)	(D)	-	(D)	-	(D)	81 012	110 173
3332	Primary lead									
	Number of establishments	12	1	1	1	4	-	1	3	1
	Number of employees	(G)	(D)	(D)	(D)	128	-	(D)	1 102	(D)
	Payroll, first quarter ($1000)	(D)	(D)	(D)	(D)	601	-	(D)	7 656	(D)
	Payroll, annual ($1000)	(D)	(D)	(D)	(D)	2 480	-	(D)	31 777	(D)
3333	Primary zinc									
	Number of establishments	12	1	1	1	2	3	-	4	-
	Number of employees	(G)	(D)	(D)	(D)	(D)	212	-	1 345	-
	Payroll, first quarter ($1000)	(D)	(D)	(D)	(D)	(D)	1 725	-	8 359	-
	Payroll, annual ($1000)	(D)	(D)	(D)	(D)	(D)	8 248	-	32 959	-
3334	Primary aluminum									
	Number of establishments	36	8	3	1	-	-	1	9	10
	Number of employees	18 673	(D)	25	(D)	-	-	(D)	3 663	7 682
	Payroll, first quarter ($1000)	171 378	(D)	108	(D)	-	-	(D)	38 520	63 409
	Payroll, annual ($1000)	690 623	(D)	481	(D)	-	-	(D)	160 261	267 681
3339	Primary nonferrous metals, nec									
	Number of establishments	102	37	14	12	12	8	9	4	5
	Number of employees	8 809	79	(D)	153	366	562	1 458	1 319	(D)
	Payroll, first quarter ($1000)	57 198	363	(D)	680	1 558	3 562	8 045	9 386	(D)
	Payroll, annual ($1000)	241 289	1 945	(D)	3 045	6 699	14 762	34 435	36 472	(D)
334	Secondary nonferrous metals									
	Number of establishments	442	118	63	61	78	71	40	8	2
	Number of employees	20 358	231	428	862	2 588	5 036	5 726	2 816	(D)
	Payroll, first quarter ($1000)	112 291	910	1 904	4 949	13 369	26 373	31 615	15 252	(D)
	Payroll, annual ($1000)	474 920	11 274	8 131	19 061	56 773	110 261	128 611	64 644	(D)
335	Nonferrous rolling and drawing									
	Number of establishments	973	86	78	95	157	168	232	94	39
	Number of employees	155 076	173	545	1 394	5 286	12 242	38 242	31 623	26 454
	Payroll, first quarter ($1000)	879 990	797	2 138	7 075	23 057	55 052	182 797	171 185	150 053
	Payroll, annual ($1000)	3 718 189	5 606	9 849	29 477	103 543	242 231	769 941	728 626	627 890
3351	Copper rolling and drawing									
	Number of establishments	131	11	11	14	26	17	27	13	11
	Number of employees	22 052	20	(D)	196	933	1 281	4 370	4 664	8 636
	Payroll, first quarter ($1000)	117 679	76	(D)	1 379	3 864	6 471	22 364	23 931	47 306
	Payroll, annual ($1000)	517 307	2 489	(D)	3 975	17 333	28 945	95 463	103 797	210 376
3353	Aluminum sheet, plate, and foil									
	Number of establishments	56	8	1	4	3	8	8	11	3
	Number of employees	27 136	(D)	(D)	56	102	558	1 306	(D)	2 413
	Payroll, first quarter ($1000)	214 917	(D)	(D)	202	591	3 040	8 629	(D)	19 043
	Payroll, annual ($1000)	911 128	(D)	(D)	1 115	2 689	13 789	35 281	(D)	80 755

A:0-19; B:20-99; C:100-249; E:250-499; F:500-999; G:1,000-2499; H:2,500-4,999; I:5,000-9,999; J:10,000-24,999; K:25,000-49,999; L:50,000-99,999; M:100,000 or more.

Table 3. Market Value of Agricultural Products Sold and Farms by Standard Industrial Classification: 1982 and 1978

[For meaning of abbreviations and symbols, see introductory text]

Item		Florida	Alachua	Baker	Bay	Bradford	Brevard	Broward
MARKET VALUE OF AGRICULTURAL PRODUCTS SOLD								
Total sales (see text)	farms, 1982	36 352	1 106	232	93	399	540	479
	1978	36 109	1 005	220	92	346	541	467
	$1,000, 1982	3 522 103	35 197	17 358	1 281	18 923	18 761	45 247
	1978	3 025 633	31 764	14 739	1 249	14 409	14 829	41 967
Average per farm	dollars, 1982	96 869	31 823	74 820	13 771	42 412	34 742	94 461
	1978	83 792	29 825	66 993	13 574	41 644	27 410	89 865
1982 value of sales:								
Less than $1,000	farms	6 822	245	52	19	91	145	89
	$1,000	2 006	77	21	5	27	30	26
$1,000 to $2,499	farms	5 465	174	53	23	96	91	78
	$1,000	8 909	284	90	37	167	147	126
$2,500 to $4,999	farms	4 824	184	33	23	63	62	46
	$1,000	17 255	646	121	76	225	219	155
$5,000 to $9,999	farms	4 449	172	20	13	42	62	65
	$1,000	31 177	1 204	154	100	284	431	440
$10,000 to $19,999	farms	3 731	104	9	4	28	67	47
	$1,000	52 368	1 463	127	(D)	376	928	614
$20,000 to $39,999	farms	3 129	87	15	8	17	41	38
	$1,000	88 418	2 504	456	187	447	1 202	1 012
$40,000 to $99,999	farms	3 225	69	16	-	15	35	38
	$1,000	202 379	4 349	971	-	969	2 122	2 420
$100,000 to $249,999	farms	2 273	42	14	1	19	17	30
	$1,000	357 129	6 755	2 613	(D)	3 374	2 618	4 381
$250,000 or more	farms	2 396	24	20	2	28	20	38
	$1,000	2 754 435	17 446	12 806	(D)	11 054	11 063	36 039
Abnormal farms	farms	38	5	-	-	-	-	-
	$1,000	7 947	468	-	-	-	-	-
1978 value of sales:								
Less than $1,000	farms	4 339	124	39	19	60	114	58
	$1,000	1 585	51	19	7	23	(D)	15
$1,000 to $2,499	farms	5 928	235	50	22	70	95	94
	$1,000	9 716	385	78	37	121	(D)	155
$2,500 to $4,999	farms	5 062	187	23	17	58	73	57
	$1,000	18 086	646	76	59	208	247	207
$5,000 to $9,999	farms	4 605	148	31	15	38	74	62
	$1,000	34 353	1 006	209	97	268	516	443
$10,000 to $19,999	farms	4 445	113	19	9	30	67	43
	$1,000	62 600	1 638	255	114	418	901	606
$20,000 to $39,999	farms	3 609	91	14	3	15	37	38
	$1,000	101 053	2 493	406	83	419	1 026	1 050
$40,000 to $99,999	farms	3 599	103	5	3	28	41	48
	$1,000	225 419	6 240	264	162	1 754	2 548	3 239
$100,000 to $249,999	farms	2 228	44	19	4	30	30	41
	$1,000	348 998	7 347	3 081	690	4 941	4 942	6 163
$250,000 or more	farms	1 983	18	20	-	17	9	26
	$1,000	2 217 893	11 410	10 350	-	6 257	4 464	30 090
Abnormal farms	farms	51	6	-	-	-	1	-
	$1,000	6 830	546	-	-	-	(D)	-
Sales by commodity or commodity group:								
Crops, including nursery and greenhouse products	farms, 1982	19 365	470	76	43	117	313	259
	1978	21 903	565	101	49	122	376	267
	$1,000, 1982	2 516 959	13 873	5 445	797	1 362	14 579	27 991
	1978	2 167 111	15 139	4 130	624	1 352	10 391	25 744
Grains	farms, 1982	3 384	147	25	8	19	1	4
	1978	4 603	270	33	8	38	-	2
	$1,000, 1982	85 624	2 674	245	35	132	(D)	105
	1978	71 804	3 436	279	(D)	252	-	(D)
Corn for grain	farms, 1982	1 775	102	21	7	17	1	1
	$1,000, 1982	28 712	1 327	(D)	(D)	49	(D)	(D)
Wheat	farms, 1982	869	14	-	-	1	-	-
	$1,000, 1982	8 310	72	-	-	(D)	-	-
Soybeans	farms, 1982	2 077	62	4	2	3	-	2
	$1,000, 1982	43 794	942	206	(D)	(D)	-	(D)
Sorghum for grain	farms, 1982	157	13	-	-	-	-	-
	$1,000, 1982	1 068	69	-	-	-	-	-
Oats	farms, 1982	323	6	-	-	-	-	-
	$1,000, 1982	1 743	28	-	-	-	-	-
Other grains	farms, 1982	228	12	1	-	2	-	1
	$1,000, 1982	1 998	246	(D)	-	(D)	-	(D)
Cotton and cottonseed	farms, 1982	81	-	-	-	-	-	-
	1978	29	-	-	-	-	-	-
	$1,000, 1982	2 896	-	-	-	-	-	-
	1978	701	-	-	-	-	-	-
Tobacco	farms, 1982	578	66	7	-	2	-	-
	1978	916	101	14	-	6	-	-
	$1,000, 1982	30 601	3 189	186	-	(D)	-	-
	1978	26 831	3 143	275	-	78	-	-
Hay, silage, and field seeds	farms, 1982	2 209	109	10	7	37	3	7
	1978	2 216	115	17	12	43	6	10
	$1,000, 1982	16 510	708	36	26	194	(D)	(D)
	1978	14 857	584	47	77	161	(D)	(D)
Vegetables, sweet corn, and melons	farms, 1982	2 453	152	23	11	39	6	15
	1978	2 917	186	33	12	42	5	30
	$1,000, 1982	572 729	4 318	164	38	776	30	4 565
	1978	459 476	5 244	154	37	584	(D)	10 224

Table 3. Market Value of Agricultural Products Sold and Farms by Standard Industrial Classification: 1982 and 1978—Con.

[For meaning of abbreviations and symbols, see introductory text]

Item		De Soto	Dixie	Duval	Escambia	Flagler	Franklin	Gadsden
MARKET VALUE OF AGRICULTURAL PRODUCTS SOLD—Con.								
Total sales—Con.								
Sales by commodity or commodity group—Con.								
Crops, including nursery and greenhouse products—Con.								
Fruits, nuts, and berries	farms, 1982	210	1	19	12	2	-	16
	1978	250	-	11	21	1	-	27
	$1,000, 1982	16 924	(D)	42	(D)	(D)	-	60
	1978	24 576	-	21	(D)	(D)	-	36
Nursery and greenhouse products	farms, 1982	16	1	78	28	2	-	15
	1978	12	5	71	32	3	-	15
	$1,000, 1982	1 469	(D)	4 122	403	(D)	-	16 355
	1978	1 071	30	2 140	459	(D)	-	4 100
Other crops	farms, 1982	-	2	2	2	14	-	15
	1978	1	4	-	2	13	-	31
	$1,000, 1982	-	(D)	(D)	(D)	3 674	-	290
	1978	(D)	23	-	(D)	1 365	-	653
Livestock, poultry, and their products	farms, 1982	327	107	332	260	74	5	291
	1978	294	98	258	261	61	5	331
	$1,000, 1982	13 941	1 279	26 526	4 704	1 289	(D)	5 219
	1978	11 075	1 147	24 222	3 298	1 019	(D)	7 060
Poultry and poultry products	farms, 1982	9	4	38	24	5	-	8
	1978	6	5	39	22	3	-	14
	$1,000, 1982	2 929	(D)	2 354	7	10	-	(D)
	1978	2 221	(D)	1 730	59	(D)	-	(D)
Dairy products	farms, 1982	1	2	32	10	-	-	1
	1978	4	-	28	13	-	-	4
	$1,000, 1982	(D)	(D)	18 689	3 599	-	-	(D)
	1978	(D)	-	17 052	2 008	-	-	(D)
Cattle and calves	farms, 1982	314	93	256	219	71	2	235
	1978	284	84	181	212	58	2	231
	$1,000, 1982	9 389	704	2 781	916	1 195	(D)	2 165
	1978	7 324	928	2 293	996	947	(D)	2 289
Hogs and pigs	farms, 1982	8	29	60	29	9	-	80
	1978	8	39	73	36	5	1	145
	$1,000, 1982	(D)	184	2 226	(D)	(D)	-	906
	1978	(D)	140	2 911	(D)	(D)	(D)	(D)
Sheep, lambs, and wool	farms, 1982	1	-	-	1	-	-	6
	1978	1	-	-	2	1	-	2
	$1,000, 1982	(D)	-	-	(D)	-	-	7
	1978	(D)	-	-	(D)	(D)	-	(D)
Other livestock and livestock products (see text)	farms, 1982	26	7	55	39	7	3	21
	1978	26	2	46	39	5	2	17
	$1,000, 1982	(D)	26	477	51	(D)	12	39
	1978	(D)	(D)	238	67	(D)	(D)	44
1982 FARMS BY STANDARD INDUSTRIAL CLASSIFICATION								
Cash grains (011)		-	-	-	203	1	-	68
Field crops, except cash grains (013)		1	4	12	29	10	-	32
Cotton (0131)		-	-	-	-	-	-	-
Tobacco (0132)		-	3	-	-	-	-	4
Sugar crops, Irish potatoes, hay, peanuts, and other field crops (0133, 0134, 0139)		1	1	12	29	10	-	28
Vegetables and melons (016)		10	9	13	34	18	-	32
Fruits and tree nuts (017)		214	-	20	21	2	-	14
Horticultural specialties (018)		12	1	74	27	2	-	13
General farms, primarily crop (019)		1	2	3	9	-	-	15
Livestock, except dairy, poultry, and animal specialties (021)		277	93	243	165	64	2	209
Beef cattle, except feedlots (0212)		258	68	173	123	57	2	146
Dairy farms (024)		1	2	30	10	-	-	1
Poultry and eggs (025)		5	2	23	2	1	-	4
Animal specialties (027)		18	2	45	18	3	3	14
General farms, primarily livestock (029)		2	3	7	4	2	-	2

Data on gross farm marketings was obtained from the 1982 Census of Agriculture, Volume 1, Geographic Areas Series State and County Data, Table 3. Exhibit Six provides an example of the type of information available from the 1982 Census of Agriculture. Note in Exhibit Six that gross farm marketings is defined as "Market Value of Agricultural Products Sold." This information is recorded by state, county/parish, and commodity (or, commodity group).

To use farm commodity information from the agriculture census, it was necessary to develop a directory for agricultural commodities. This need stems from the fact that the commodity and commodity groups used in the agricultural census do not match the agricultural sectors of the national Use table. Therefore, a directory was prepared to match commodity descriptions, which is presented here as Figure Five.

Using the Agriculture Directory of Figure Five, farm marketings data from the 1982 Census of Agriculture report were "hand entered" to create the AGCROPS.PRN file for the individual Coastal Areas. A portion of this file is illustrated on the next page as Table 24.

Notice from Table 24 that some of the values recorded in the AGCROPS.PRN file appear several times. This situation reflects the fact that there is not an exact match between the I/O industries (categories) and the agriculture census commodity categories. The lack of a one-to-one match is not a serious problem, however, since the 17 agriculture industries used in the 537-industry level national Use table were eventually aggregated into two agricultural sectors for the Coastal Area I/O models.

Notice also from Table 24 that the last two rows of the AGCROPS.PRN files have nothing to do with agriculture. For convenience, employment and wage information for the railroad sector was appended to this file. Like agriculture, County Business Patterns reports do not contain information on railroad activity.

II.C.1.c. The AGWAGE.DAT File

This is a very small file, but it is a necessary file in the SAM system, for it is used to convert agricultural output impacts to impacts on employment and income impacts.

The AGWAGE.DAT file was created by hand entering wage-to-employment ratios for the I/O agricultural sectors. This file contains two rows, for the two I/O agricultural sectors, and ten columns for the ten Coastal Areas.

Wage-to-employment ratios were calculated by hand on the basis of wage and employment information reported in the 1982 Census of Agriculture. Due to the lack of detail in the reported information, it was necessary to use the same wage-to-employment ratios for both I/O agricultural sectors and for all ten Coastal Areas. This is not a severe limitation in light of the fact that agriculture is only remotely related to OCS oil and gas activities. Thus, any error introduced here

should have only a negligible effect on the total socioeconomic impacts of OCS oil and gas activity. Moreover, using the editing capabilities of SAM, this situation can be corrected in the future, providing more detailed information is obtained.

As a final important comment, the wage data used in the calculation of the wage-to-employment ratios include only wages of hired farm workers. In other words, farm proprietor income is excluded from this ratio. For impact assessment purposes, it was assumed that farm proprietor employment would not significantly change. Any change in farm employment, it was assumed, would be limited to a change in the number of hired workers.

II.C.1.d. The USE.DAT File

The USE.DAT File was developed from the 1977 national Use table that contains industry detail at the 537 industry and commodity level. The Bureau of Economic Analysis of the U.S. Department of Commerce published the 1977 Use (and, also, the Make) table at three levels of industry detail: the 85-level, the 366-level, and the 537 industry and commodity level. The 537-level, the most detailed level for industries and commodities, was used in the development of the I/O models for the MMS Coastal Areas.

The USE.DAT file actually contains more than 537 columns and rows for industries and commodities, respectively. In fact, the file contains 538 columns, where the 538th column is the Personal Expenditures column. Information from this column was used to develop employee expenditure estimates for the Coastal Areas. The number of rows contained in the USE.DAT File is 540, where rows 538 through 540 report income which is part of value added. Row 538 contains information on compensation to employees, which was used to develop employee compensation for the Coastal Areas. The particular industries from the national Use table (and, hence, the USE.DAT File) that make-up the 116-sector MMS I/O models for the Coastal Areas are indicated in the directory of Appendix C.

The USE.DAT File shows, in millions of dollars, the value of each commodity (i.e., materials and services) used by each industry. More specifically, the entries in a row represent the use by each industrial and final demand user of the commodity named at the beginning of the row. The entries in a column represent the value of the commodities--raw materials, semifinished products, and services--used, and income generated, in production by the industry named at the head of the column. Thus, rows in the USE.DAT File represent commodities and three income categories. Columns represent industries and one final demand category--personal expenditures.

It is extremely important to understand that the CBP.FTN program and the various SAM macros that have been prepared for the analyst are dedicated to the current I/O codes used by the Bureau of Economic Analysis for the publication of the 1977 Use and Make tables. Should the Bureau of Economic Analysis use a different set of codes for their

TABLE 24

AGCROPS.PRN FILE
($1,000)

I/O Number	I/O Sector Name	W1	W2	C1	C2	US
1.0100	Dairy Farm Prod.	0	4,835	3,302	4,070	
1.0200	Poultry & Eggs	17	628	43	11,538	
1.0301	Meat Animals	64,017	53,433	10,493	8,208	
1.0302	Misc. Livestock	1,187	5,654	877	574	
2.0100	Cotton	75,322	9,048	0	0	
2.0201	Food Grains	14,705	33,652	35,935	10,995	
2.0202	Feed Grains	157,094	118,889	44,722	12	
2.0203	Tobacco	0	0	0	0	
2.0401	Fruit	10,974	96	4	123	
2.0402	Tree Nuts	10,974	96	4	123	
2.0501	Vegetables	9,301	3,544	43	788	
2.0502	Sugar Crops	3,366	1,778	25,993	74,127	
2.0503	Misc. Crops	3,366	1,778	25,993	74,127	
2.0600	Oil Bearing Crops	22,093	91,589	44,521	0	
2.0701	Forest Products	0	0	0	0	
2.0702	Greenhouse & Nursery	9,152	41,124	2,161	822	
6.50100	Railroad-Emp.	604	5,236	730	683	
6.50100	Railroad-Wage	21,553	186,886	35,127	24,673	

Source: U.S. Department of Agriculture, 1982 census of agriculture. [Wasnington, D.C.]: U.S. Government Printing Office.

U.S. Department of Commerce, The income and employment series. [Washington, D.C.]: U.S. Government Printing Office.

next publication of national Use and Make tables, several changes in the SAM system will be required by the analyst.

II.C.1.e. The MAKE.DAT File

The MAKE.DAT file represents the 537-level national Make table for 1977. This file contains 538 rows and columns where the 538th row and column represent the employee sector of a make table.

The entries in a row of the MAKE.DAT file represent the value of the commodities--both primary and secondary--produced by the industry named at the beginning of the row. The value of the primary product is shown in the diagonal cell (the cell where the row with a given number intersects the column with the same number). The secondary products of the industry (products that are primary to other industries) are shown in the other cells along the row. Column entries represent the dollar value of the production by each industry of the commodity named at the head of the column.

II.C.1.e. The DEMOGF__.PRN Files

The DEMOGF__.PRN files contain the demographic statistics to convert sector-level employment estimates to population estimates by sex for adults and by age distribution for female adults, male adults, and children. The demographic statistics that make-up these files come from Tables 19, 22, and 23.

There are ten DEMOGF__.PRN files for the ten Coastal Areas. These files are identified below by name.

File Name	Description
DEMOGFE1.PRN	Coastal Area E1 (Florida counties)
DEMOGFE2.PRN	Coastal Area E2 (Florida counties)
DEMOGFE3.PRN	Coastal Area E3 (Florida counties)
DEMOGFE4.PRN	Coastal Area E4 (Florida counties)
DEMOGFC1.PRN	Coastal Area C1 (Louisiana parishes)
DEMOGFC2.PRN	Coastal Area C2 (Louisiana parishes)
DEMOGFC3.PRN	Coastal Area C3 (Louisiana parishes)
DEMOGFC4.PRN	Coastal Area C4 (Mississippi & Alabama counties)
DEMOGFW1.PRN	Coastal Area W1 (Texas counties)
DEMOGFW2.PRN	Coastal Area W2 (Texas counties)

Since the demographic statistics from Tables 19, 22, and 23 represent average values for the combined Coastal Areas, the DEMOGF__.PRN files are identical. In other words, because of current data constraints, area-specific demographic statistics are not present in these demographic files. Thus, it was assumed that averages for demographic statistics are appropriate at the Coastal Area level. Given the editing features and capabilities of SAM, averages can be replaced

by area-specific statistics in the event that more detailed information becomes available.

Table 25 defines the format used in the construction of the DEMOGF__.PRN files. Notice in Table 25 that the two worker types, Onshore Operations and Onshore Construction of Tables 22 and 23, have been aggregated to a single worker type called Onshore.

Finally, as noted earlier, the Demographic component of SAM is actually a macro that retrieves demographic statistics from the appropriate DEMOGF__.PRN file to calculate population estimates for the Coastal Area in question. This means that the DEMOGF__.PRN files can be edited within the SAM system.

II.C.1.f. The GULFPRC.DAT File

The explanation of Step One in the six-step process used to develop the Coastal Area I/O models (Section II.A.3.) basically explains how this file is developed. As explained earlier, this file was developed from producer and consumer price index information. Special construction indices were used for the construction sectors and for the maintenance and repair sectors named in the national Use and Make tables.

The price directory of Appendix D was used to update the national Use table to reflect 1984 relative prices. The particular indices used in this adjustment process are given in the last column of Appendix D. This column is the GULFPRC.DAT vector file.

It is important to note that if it is necessary to define socioeconomic impact estimates in terms of current prices, then the GULFPRC.DAT file must be regularly updated with current price information.

II.C.2. Internal Files

Five individual file sets comprise the group of internal files. These are AREA__.DAT, GULFIMP.DAT, LQ__.DAT, REGION__.DAT, and REGION__.TOT. These files will be explained in this order.

II.C.2.a. The AREA__.DAT Files

The AREA___.DAT files, consisting of employment and earnings information, are created in the SAM system from the CBP4__.DAT external files that were explained earlier. Thus, there are ten individual AREA__.DAT files for the ten Coastal Areas and one AREAUS.DAT file for the U.S., as indicated below.

TABLE 25

DEMOGF__.PRN FILE FORMAT

ROW NUMBER		WORKER TYPE		
		OFFSHORE	ONSHORE	SECONDARY TYPE 1	SECONDARY TYPE 2
1	Worker Class (i.e., origin		-- Local		
2			-- Commuter		
3			-- Relocator		
4	(Percent of relocating workers with children)				
5	(Percent of relocating workers who are males)				
6	(Ave. number of children per relocating worker with children)				
7	(Numtiple job holder adjustment factor)				
8	Age distribution of male migrants		20 - 24		
9			25 - 34		
10			35 - 44		
11			45 - 64		
12	Age distribution of female migrants		20 - 24		
13			25 - 34		
14			35 - 44		
15			45 - 64		
16	Age distribution of children		0 - 5		
17			6 - 11		
18			12 - 14		
19			15 - 17		
20			18 - 19		
21			20 - 24		

Source: DEMOGF__.PRN file.

File Name	Description
AREAE1.DAT	Coastal Area E1 (Florida counties)
AREAE2.DAT	Coastal Area E2 (Florida counties)
AREAE3.DAT	Coastal Area E3 (Florida counties)
AREAE4.DAT	Coastal Area E4 (Florida counties)
AREAC1.DAT	Coastal Area C1 (Louisiana parishes)
AREAC2.DAT	Coastal Area C2 (Louisiana parishes)
AREAC3.DAT	Coastal Area C3 (Louisiana parishes)
AREAC4.DAT	Coastal Area C4 (Mississippi and Alabama counties)
AREAW1.DAT	Coastal Area W1 (Texas counties)
AREAW2.DAT	Coastal Area W2 (Texas counties)
AREAUS.DAT	U.S. Totals (all counties/parishes)

Basically, the AREA__.DAT files contain employment and earnings information that matches the 537 industry/commodity categories of the national Use and Make tables. The parent files are the CBP4__.DAT files plus the CBP4US2.DAT file. For use with the USE.DAT and MAKE.DAT files, it was necessary to aggregate the various SIC categories from the CBP4__.DAT files in a way that matched exactly the I/O codes of the USE.DAT and MAKE.DAT files. However, before the SIC coded information from the CBP4__.DAT files was aggregated, it was necessary to replace the alphabetical code, which is used to suppress information to avoid disclosure problems, with estimated numeric values. Both the numeric estimation of suppressed values and the aggregation processes were handled in the SAM system by a program called the CBP.FTN program.

CBP.FTN is a large Fortran program that computes employment values, employment proxy values where necessary, wage values where possible, and industry activity weights for 113 of the 116 producing sectors named in the Coastal Area I/O models. The two agricultural sectors and the railroad sector are treated separately, since as noted earlier, CBP data omit these sectors. The CBP.FTN program, with documentation, is given in Appendix F.

The County Business Patterns data (and, hence, the CBP4__.DAT files) do not always contain full disclosure of information for all industries within a county/parish. For those industries where disclosure of employment and wages is incomplete, ranges for the number of employees and the number of firms having an employee total in a specific range are provided. Employment can then be estimated by a technique that uses midpoints of the published ranges and then balances the employment totals within SIC digit levels at the county/parish level. The first step of the technique is the preliminary calculation of employment in the industries for which employment was not disclosed in the given county/parish. This calculation is the sum of the products of the midpoints of the various employment size ranges and the number of firms in the respective ranges. When the set of such calculations, and the known employment values, for the industries contained in the same SIC digit are added, there is no guarantee that the sum will equal the employment value of the parent industry. Thus, a second step of the technique forces the sum of employment values of the group of industries contained within a lower SIC digit level to equal the employment value

of that level. This constraint is only operative when the employment value of at least one industry in the group is not disclosed and has to be estimated. Also, the adding-up constraint is relaxed in the case where enforcement would cause the employment estimate for an industry to fall below the lower bound dictated by the reporting ranges. However, the lower bound is rarely encountered.

Wages in the industries where disclosure is incomplete are estimated using the employment estimates. First, the sum of disclosed wages for a group of industries contained within a lower SIC digit level is subtracted from the wages value of that level. This remainder is then allocated to the undisclosed industries by using the proportions of their respective estimated employment values to the sum of their estimated employment values.

The employment and wages of the counties/parishes in each Coastal Area are summed to arrive at the Coastal Area values. The data, where estimated by the above techniques, are not rounded prior to the summation for the Coastal Area values.

CBP.FTN requires as input the CBP4__.DAT files for the ten Coastal Areas and the CBP4US2.DAT file for the U.S. that were discussed earlier under the External Files section. CBP.FTN should be run whenever the eleven data files have been updated. Execution of the program proceeds as follows:

```
* CBP XX                (where XX is the Coastal Area desired: W1, etc.)
-
Enter the Coastal Area Code          (you receive this prompt)
-XX                                  (enter this response)
Number of Counties= #                (you receive this information)
Number of Observations= #            (you receive this information)
```

At this point, CBP.FTN has received all the commands necessary and will begin execution. Execution time for the largest Coastal Area takes about ten minutes on the Perkin-Elmer system. Each Coastal Area must be run separately through the CBP.FTN program.

II.C.2.b. The LQ__.DAT Files

The ten LQ__.DAT files, identified below, are created in SAM using macros. Each file has 116 rows, representing the 116 industry sectors of the Coastal Area I/O models, and three columns. The first column contains location quotients; the second column contains wage-to-employment ratios; and the third column contains wage-to-total output ratios. From prepared macros that are part of the SAM system, these ratios (and, hence the LQ__.DAT files) are generated from information contained in the AREA__.DAT files and the AGCROPS.PRN file.

The LQ__.DAT Files are:

File Name	Description
LQE1.DAT	Coastal Area E1 (Florida counties)
LQE2.DAT	Coastal Area E2 (Florida counties)
LQE3.DAT	Coastal Area E3 (Florida counties)
LQE4.DAT	Coastal Area E4 (Florida counties)
LQC1.DAT	Coastal Area C1 (Louisiana parishes)
LQC2.DAT	Coastal Area C2 (Louisiana parishes)
LQC3.DAT	Coastal Area C3 (Louisiana parishes)
LQC4.DAT	Coastal Area C4 (Mississippi and Alabama counties)
LQW1.DAT	Coastal Area W1 (Texas counties)
LQW2.DAT	Coastal Area W2 (Texas counties)

II.C.2.c. The GULFIMP.DAT File

The industry inputs recorded in the USE.DAT file represent combined domestic inputs with imports. To develop industry input relationships that reflect only domestically produced inputs, imports must be removed. As noted in an earlier section (see Step Two of Section II.A.3.), imports can be removed by the residual of import proportions (i.e., 1 - import proportion of commodity i) times the corresponding row commodity i of the Use table.

The GULFIMP.DAT File is a column vector of import proportions, where the order of the vector elements (proportions) correspond to the order of the commodity rows of the USE.DAT file.

This file is constructed in SAM, and it does not need to be altered until a new national Use table becomes available.

II.C.2.d. The REGION__.DAT Files

The REGION__.DAT files are the sector-to-sector direct requirements tables of the I/O models for the Coastal Areas.

Selection 4 of the Main Menu, which is explained in the next section entitled Operations, creates the I/O model for the region in question. What this means is that Selection 4 performs the six steps, explained earlier, for constructing nonsurvey regional I/O models; that is, from the task of price updating industry input relationships to the derivation of the total requirements table. Selection 4 of the Main Menu is simply a macro that strings together certain commands available in SAM to create regional I/O models.

The ten REGION__.DAT files, which are created within the SAM system, are identified below:

File Name	Description
REGIONE1.DAT	Coastal Area E1 (Florida counties)
REGIONE2.DAT	Coastal Area E2 (Florida counties)
REGIONE3.DAT	Coastal Area E3 (Florida counties)
REGIONE4.DAT	Coastal Area E4 (Florida counties)
REGIONC1.DAT	Coastal Area C1 (Louisiana parishes)
REGIONC2.DAT	Coastal Area C2 (Louisiana parishes)
REGIONC3.DAT	Coastal Area C3 (Louisiana parishes)
REGIONC4.DAT	Coastal Area C4 (Mississippi and Alabama counties)
REGIONW1.DAT	Coastal Area W1 (Texas counties)
REGIONW2.DAT	Coastal Area W2 (Texas counties)

II.C.2.e. The REGION__.TOT Files

The final set of internal files created by the SAM system consists of the I/O total requirements tables for the Coastal Areas. These tables are the source for deriving socioeconomic impacts.

Using macros, the REGION__.TOT files, the DEMOGF__.DAT files, the AGWAGE.DAT file, and the LQ__.DAT files are linked to generate socioeconomic impact estimates of OCS oil and gas activity that are measured in terms of industry output, income, employment, and population. The operation of these macros is explained in the next section.

The ten REGION__.TOT files, which are derived from the corresponding REGION__.DAT files (i.e., the I/O direct requirements tables) within the SAM system, are identified below:

File Name	Description
REGIONE1.DAT	Coastal Area E1 (Florida counties)
REGIONE2.DAT	Coastal Area E2 (Florida counties)
REGIONE3.DAT	Coastal Area E3 (Florida counties)
REGIONE4.DAT	Coastal Area E4 (Florida counties)
REGIONC1.DAT	Coastal Area C1 (Louisiana parishes)
REGIONC2.DAT	Coastal Area C2 (Louisiana parishes)
REGIONC3.DAT	Coastal Area C3 (Louisiana parishes)
REGIONC4.DAT	Coastal Area C4 (Mississippi and Alabama counties)
REGIONW1.DAT	Coastal Area W1 (Texas counties)
REGIONW2.DAT	Coastal Area W2 (Texas counties)

II.D. The Output Component

The fourth and final component of the SAM system (Figure Two) is the Output component. This component handles the printing of the socioeconomic impact results. SAM contains a number of printing commands that involve margins, spacing, etc. These commands and options are noted under the general command PRINT, which are explained in the

Commands section of this manual. For the Output component of the SAM system (Figure Two), macros were written to string together certain printing commands to produce the socioeconomic impact tables that are reported in Volume I of the Final Report. As indicated earlier, MACRO is also a command in SAM that permits the analyst to string together commands for routine application. Thus, the particular style of the socioeconomic impact tables presented in Volume I can be changed by simply rewriting the macros. All macros provided in the SAM system are located in Appendix G.

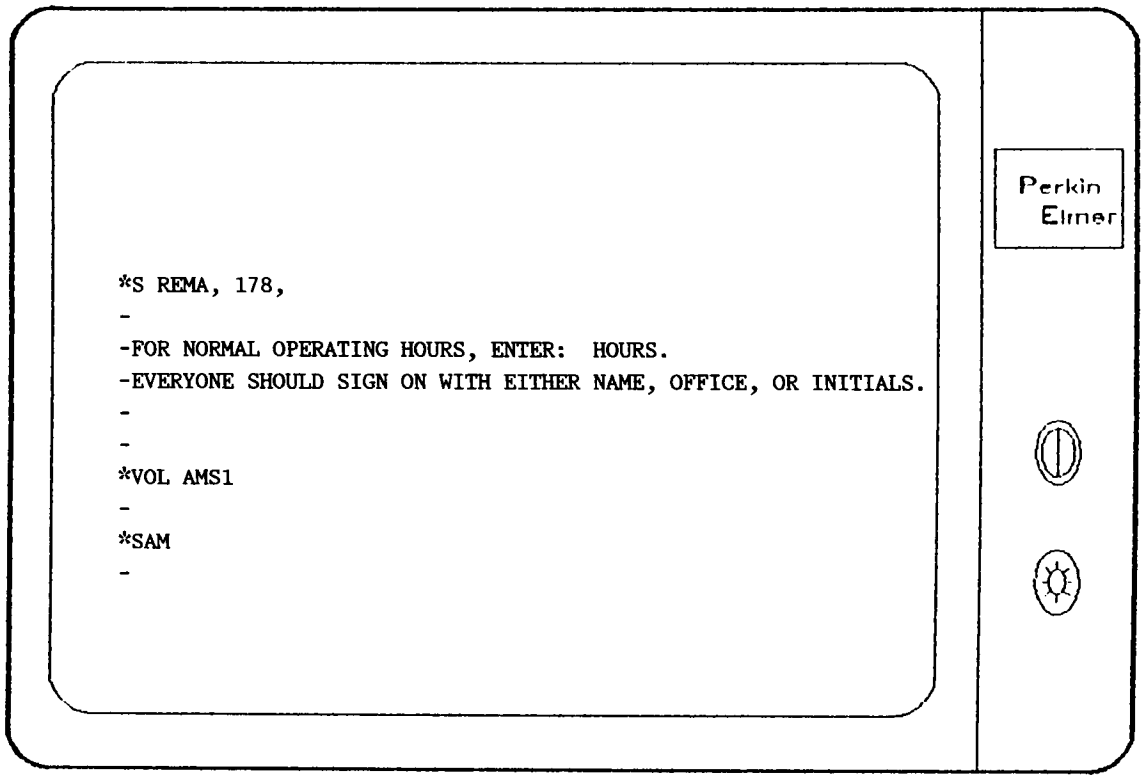
III. Operations

Macros have been written and incorporated into the SAM program for the convenience of the analyst. A macro is a stored series of commands to be entered or executed later. The commands are written representations of the keystrokes that the anal
yst can enter directly from the keyboard to execute a command. These macros have been stored and made a part of the SAM program. These macros are listed in Appendix G. Using a macro can be a lot faster and more accurate than entering commands directly from the keyboard.

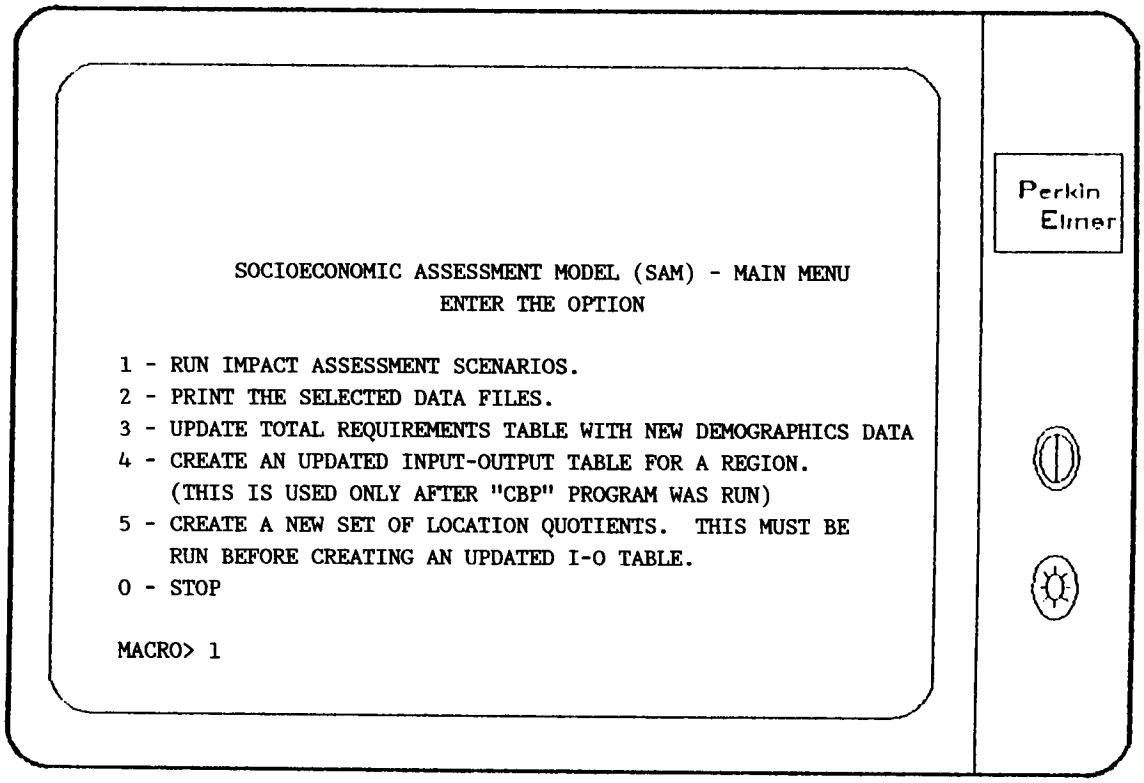
This section provides instructions for the macros that are contained in the SAM system. Remember that MACRO is a command available in SAM. Thus, as needs and (or) data characteristics change, the analyst can write new macros or simply modify the current macros presented here and documented in Appendix G.

III.A. Starting The SAM Prepared Macros

You must first log on the P-E development machine and access the AMSI volume. This is the volume in which all the data and programs are stored. At the P-E prompt, enter the command SAM. You will then be greeted by a message informing you that you are now using the Socioeconomic Assessment Model program (SAM). All commands issued in SAM must be in uppercase letters. A series of macros (which consist of a pre-defined set of SAM commands that are stored on disk as a standard ASCII file) will aid you in impact assessment. (As you become familiar with SAM, you will be able to write your own macros.) In order to end the SAM session, enter the command STOP.

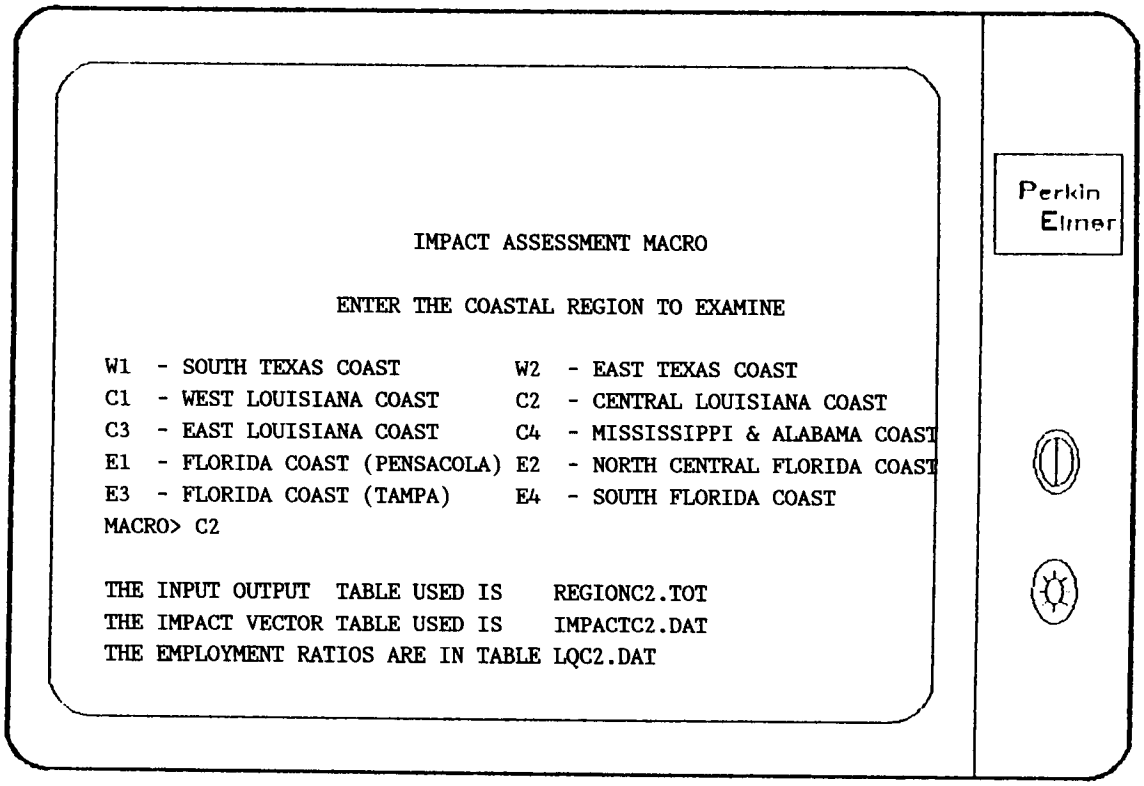


III.B. Using The SAM Prepared Macros



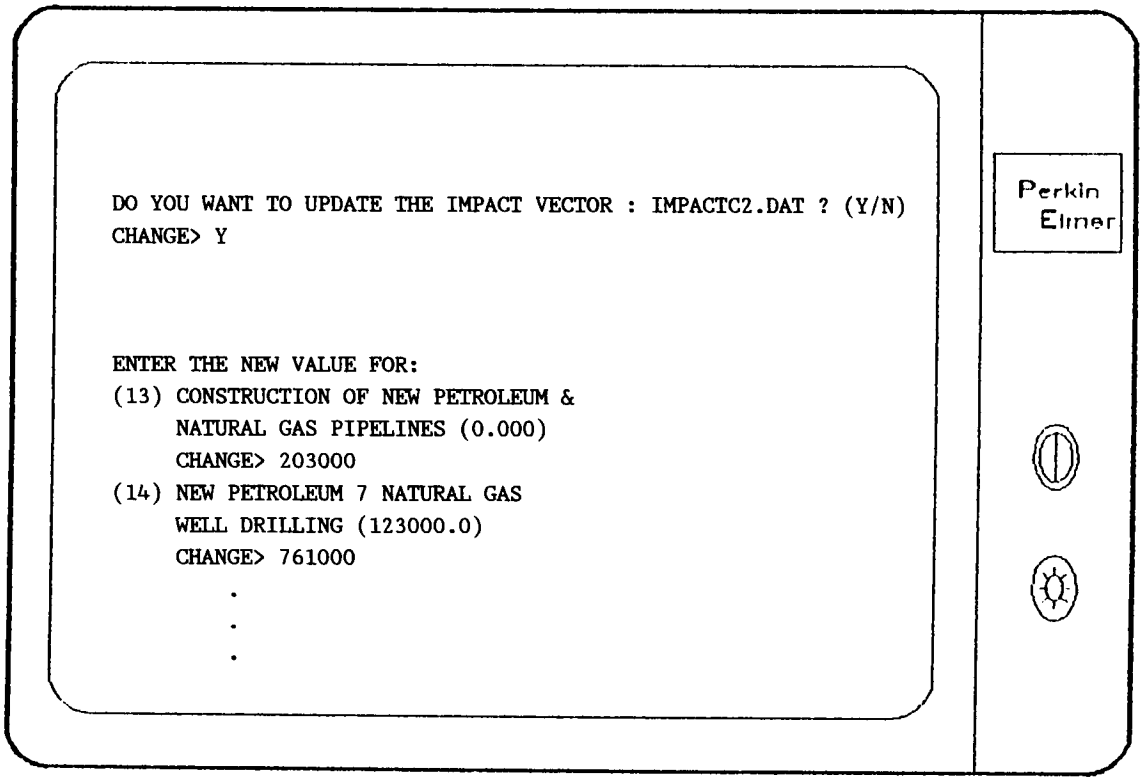
Six choices are listed in the Main Menu. After the MACRO>, enter the selection. The first selection permits you to impact any Primary Sector for any Coastal Area in which a change in final demand has occurred. A variety of output tables with respect to the impact can then be printed. Selection 2 permits you to print a variety of data files in a formatted style. The third choice permits you to update any Coastal Area's direct requirements table and total requirements table if the demographic data table has been revised. Selection 4 is used only if more recent County Business Patterns data have been processed by the CBP.FTN program or new location quotients have been constructed. This option constructs the Coastal Area input-output tables whereas Selection 3 only modifies the tables. The fifth choice creates a new set of simple location quotients from the output data of the CBP.FTN program and data from the AGWAGE.DAT file. Finally, Selection 0 ends the macro and returns you the the SAM> prompt. The command "STOP" will perform the same as the 0 selection.

Suppose you choose Selection 1, indicating that the Coastal Area input-output tables have already been constructed. The following screen will appear.



After receiving the welcome message, you will see a new system prompt. Prompts are command names followed by the > character. Prompts change with respect to different applications so that you always know what command you are executing. The first prompt you will see is SAM>. This is the standard prompt of the SAM program. In order to perform socioeconomic assessments, enter MACRO SAM.MAC at the SAM> prompt. This will invoke a series of commands to guide you through SAM.

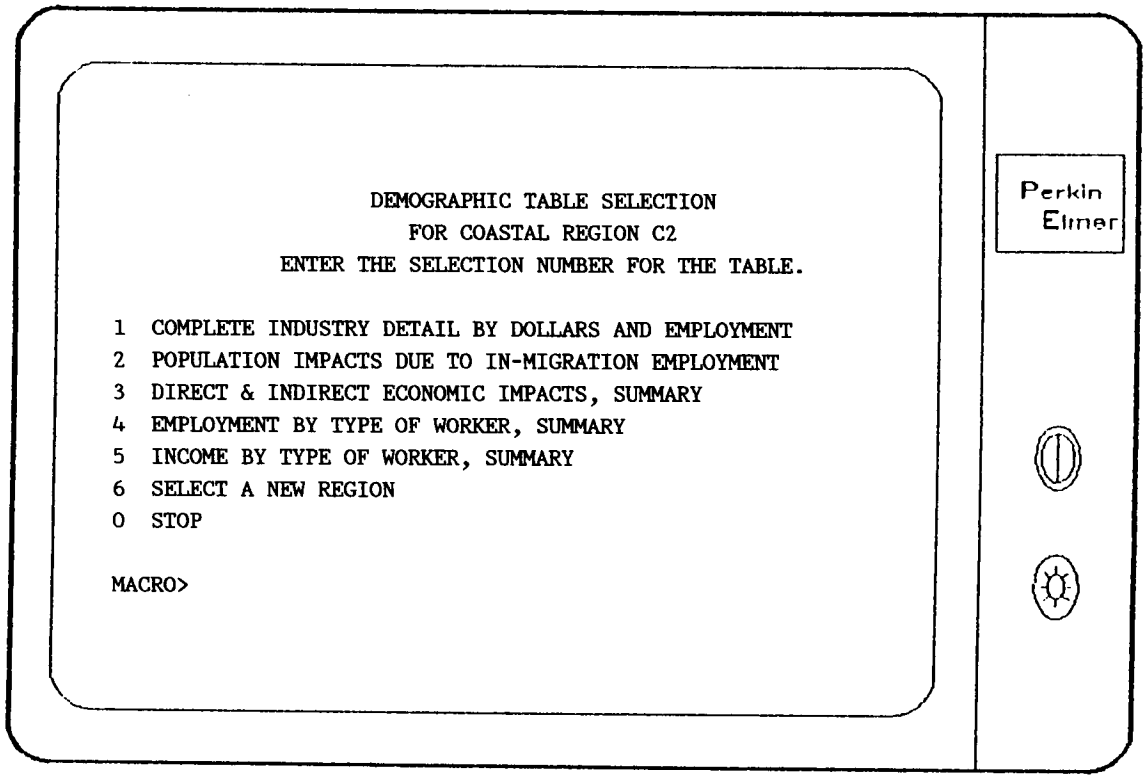
A series of messages (screens) will scroll up on the terminal. The first screen you see is the Main Menu.



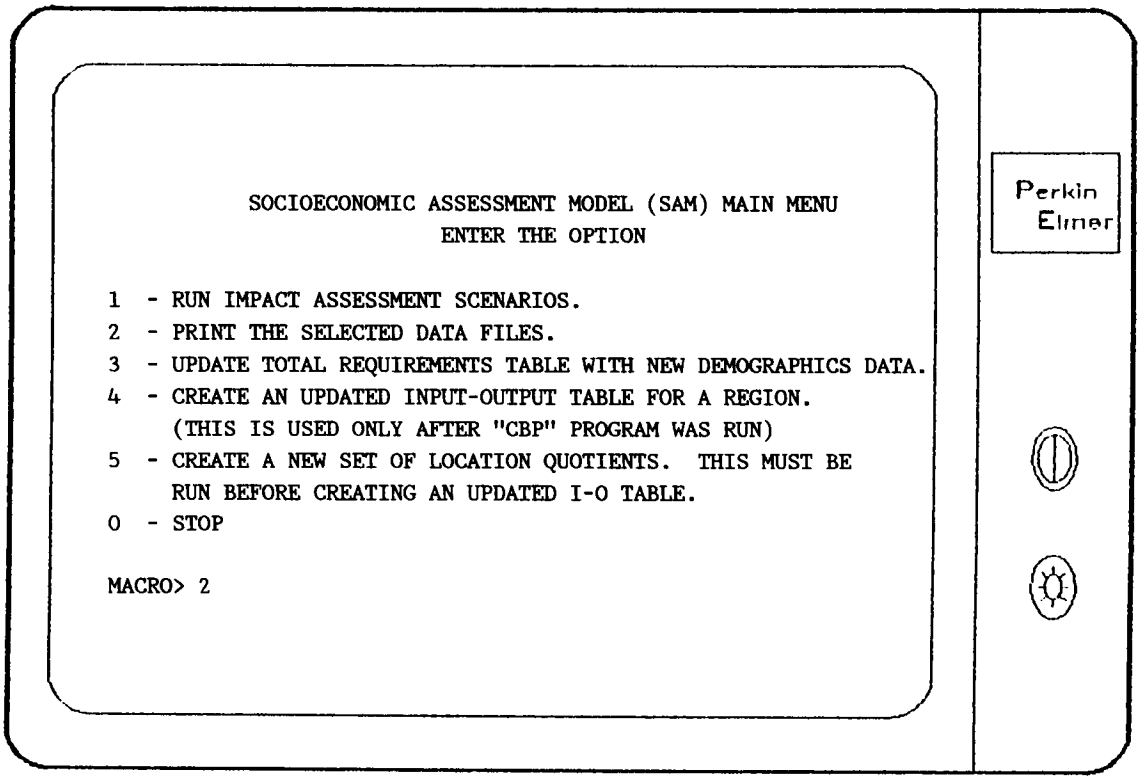
If the response is Y (yes), then you will be prompted to enter new impact values for each of the eight Primary Sectors. The values in parentheses are the current values for each sector. The sectors which may be modified in this screen are (these sector numbers refer to the MMS I/O sector numbers):

(13) New petroleum pipeline construction,
(14) New petroleum and natural gas well drilling,
(15) New petroleum and natural gas exploration,
(17) Maintenance of petroleum and natural gas facilities,
(18) Maintenance of petroleum and natural gas pipelines,
(19) Maintenance of petroleum and natural gas wells,
(39) Petroleum refining, and
(89) Pipelines except natural gas.

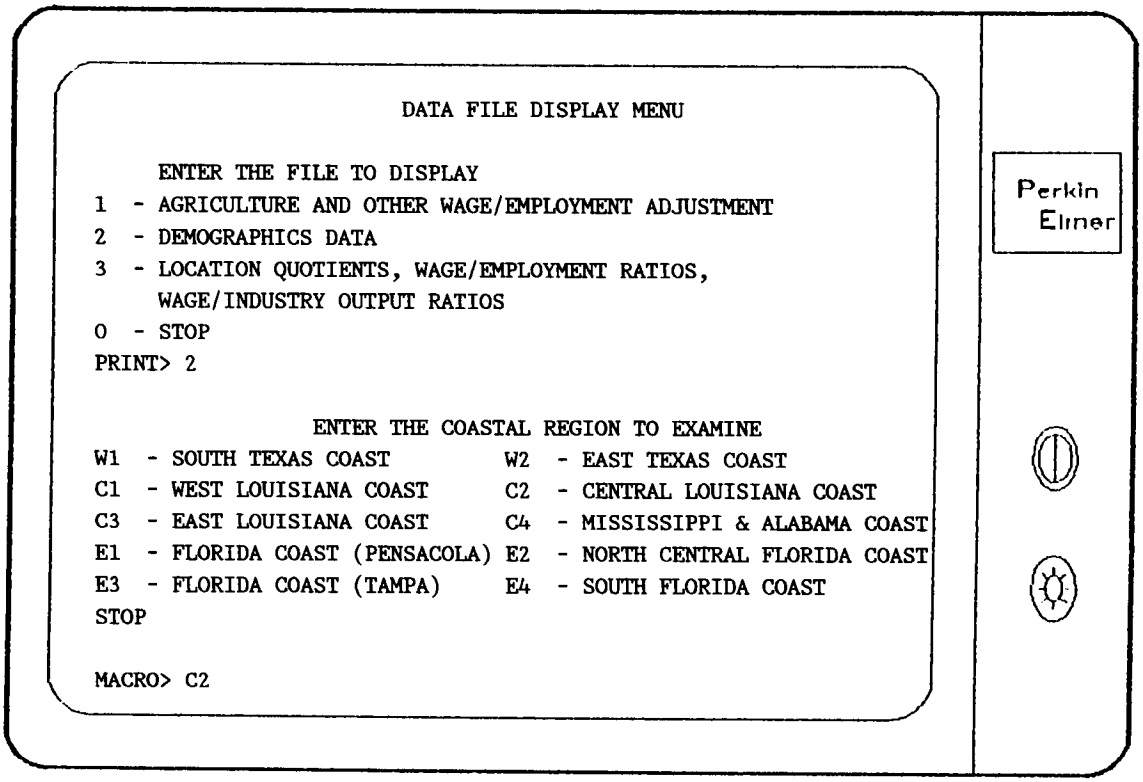
After a brief period of calculation, the following screen will appear.



There are five tables that can be printed at this time, where the output is sent to the printer (unit #8). A complete industry detail report (Table 1) lists for each of the 116 I/O sectors the initial economic impacts, total economic impacts, employment, and income. (If changes in economic activity were entered as the impact measures, then the calculations will be represented as changes.) Table 2 displays population by gender, age, and type of employment. Tables 3, 4, and 5 are summary tables of economic activity, employment, and income, respectively. Selection 0 or the command "STOP" will display the Main Menu.



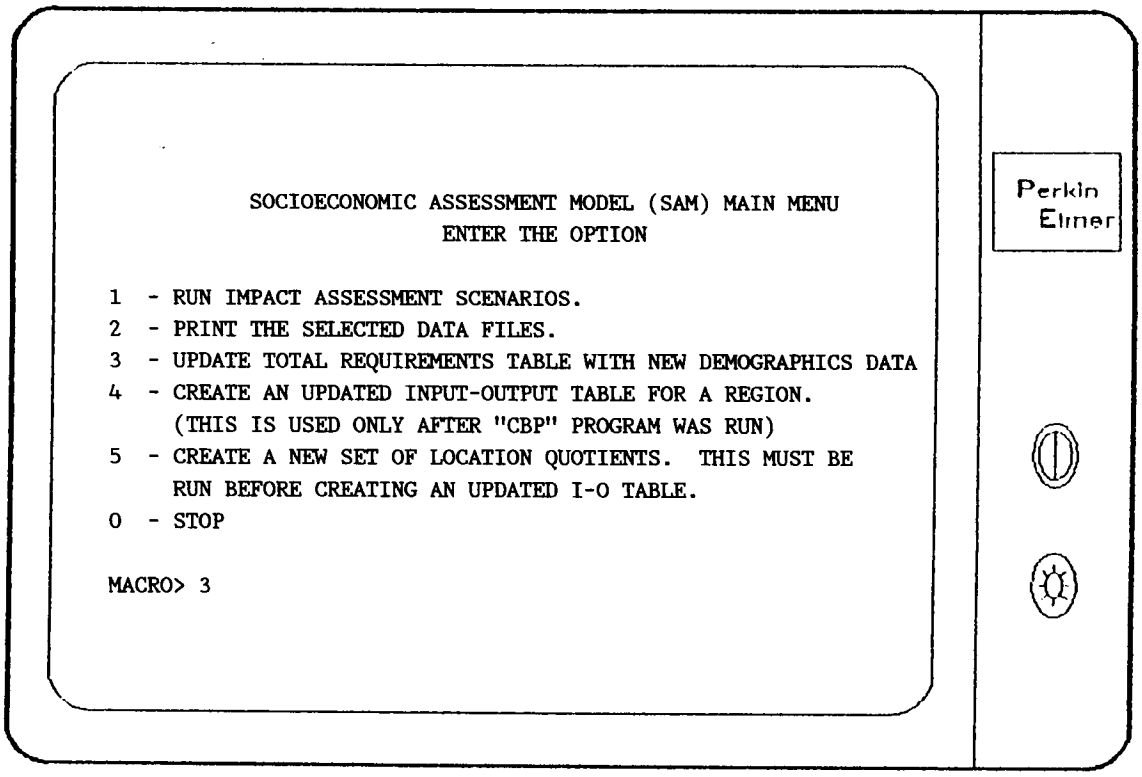
By selecting Selection 2, which is the option to display selected data files, the following screen will appear.



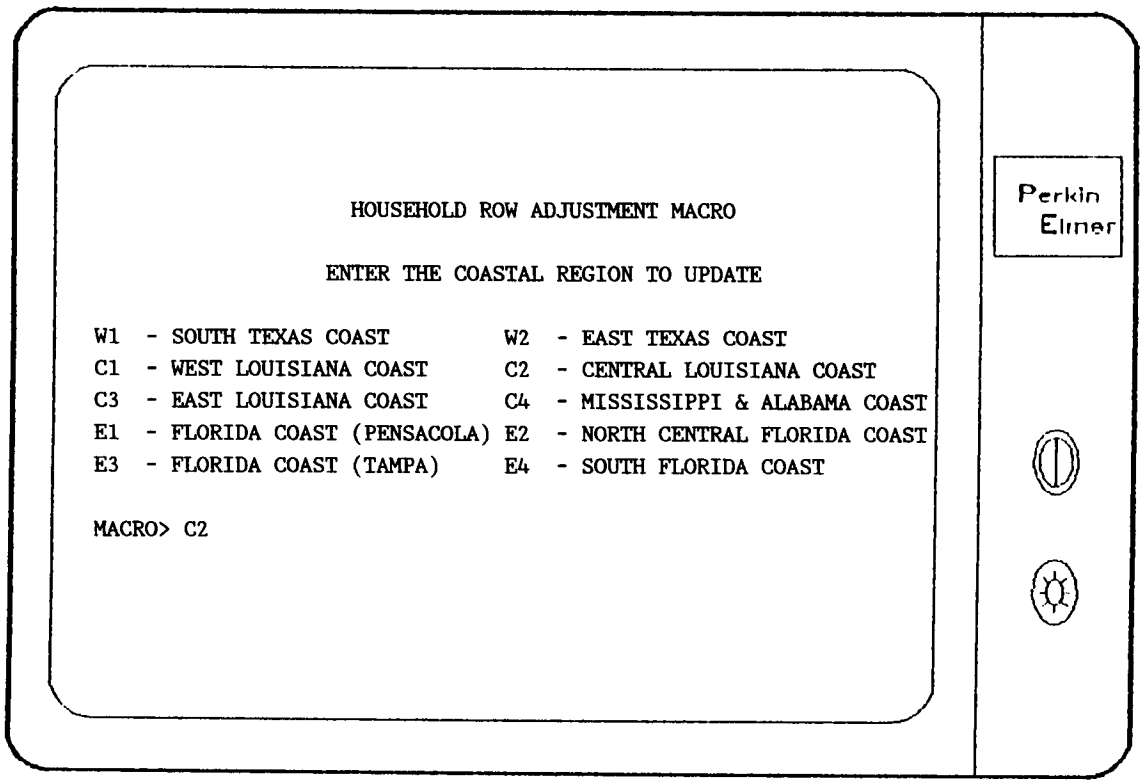
The display menu permits you to print three different files. The first file is the Agriculture and Other Wage/Employment Adjustment data file. (The file AGWAGE.DAT is printed in a transposed manner.) The second choice prints the demographic table for a given Coastal Area (DEMOGFW1.DAT. DEMOGFW2.DAT, .. DEMOGFE4.DAT). The third table, which can be printed, is the file containing location quotients, wage/employment ratios, and wage/industry output ratios (LQW1.DAT, LQW2.DAT, ..., LQE4.DAT).

If a change in any of these files is required, then the CHANGE command at the SAM> prompt must be used. (This is not part of the SAM.MAC macro. See CHANGE in the Command section of this manual.)

The 0 selection of the "STOP" command will exit this procedure and display the Main Menu. The following screen will appear.



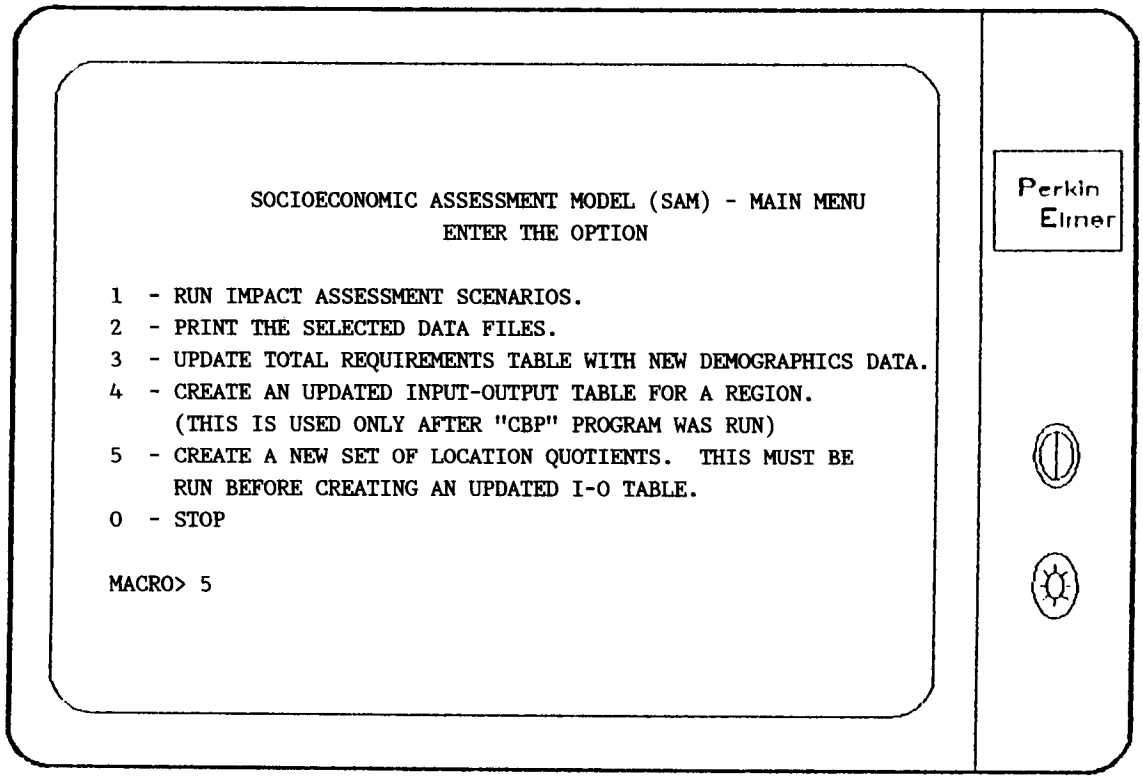
It is possible that in the future more detailed and accurate information may become available with respect to the demographic table. In the event that this occurs, the DEMOGFxx.DAT file can be updated using the CHANGE command at the SAM> prompts. (The xx represents the Coastal Area initials, W1, W2, ..., E4.) The change would have to be made before invoking the MACRO SAM.MAC command. After choosing Selection 3 the following screen will appear.



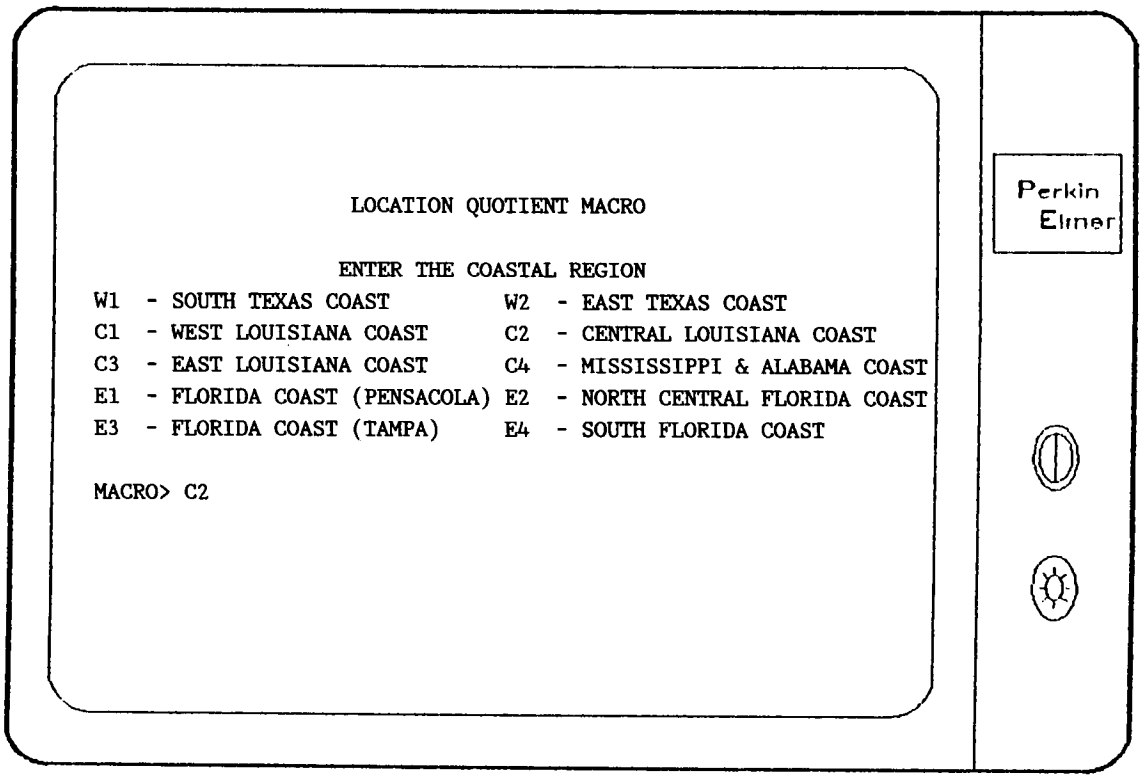
At this point you must select the Coastal Area for which you have updated the demographic data (DEMOGFxx.DAT). Selecting 0 or "STOP" will display the Main Menu.

This procedure will modify the compensation-to-employees rows of the direct requirements table and the total requirements table of the Coastal Area I/O model. There are three rows for compensation to represent each employment class: local, commuter, and relocator.

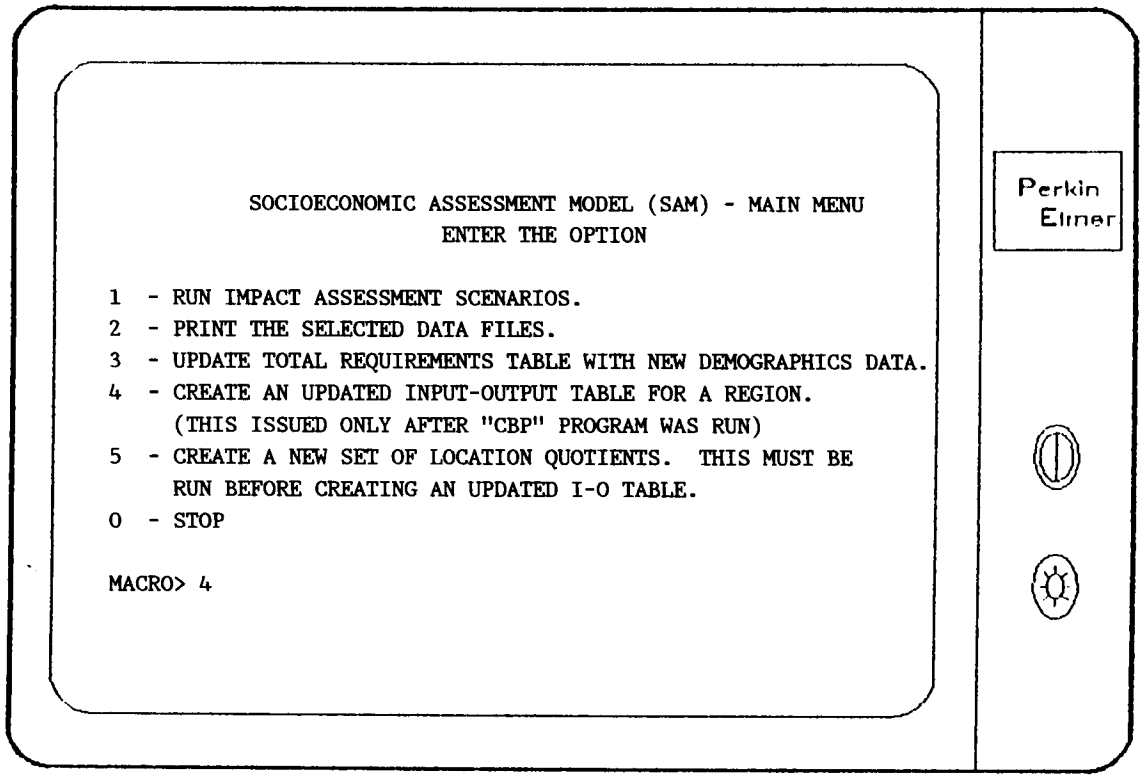
The update menu will appear again prompting you to enter another Coastal Area to update. If you are finished updating, enter the "STOP" command or 0.



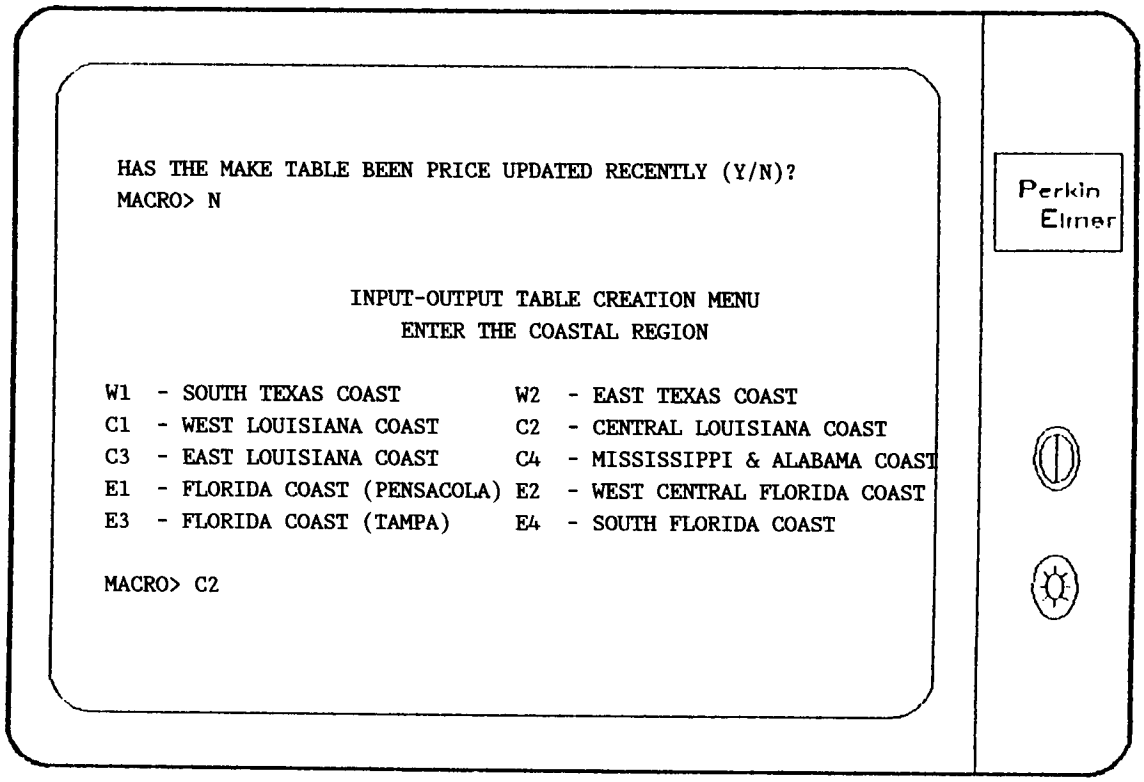
Selections 4 and 5 go together. If new County Business Patterns data are acquired and processed through the CBP.FTN program, these two selections must be made. The location quotients must be calculated first. Therefore, Selection 5 must be made before Selection 4. The following screen will appear.



The menu prompts you for the Coastal Area for which you want to calculate a new set of location quotients. The procedure will use data from the AGWAGE.DAT and AREAxx.DAT data files. The procedure creates simple location quotients and stores the results in LQxx.DAT. Other forms of location quotients may be used and stored in LQxx.DAT through the standard SAM> commands. The "STOP" command or Selection 0 will display the Main Menu again.



It is possible that you a) were able to find more recent or more accurate information concerning commodity prices (GULFPRC.DAT), b) used Selection 5 or a different method for calculating location quotients, or c) executed the CBP.FTN program for a particular Coastal Area. Under these circumstances, you must run the Selection 4 and create a new direct requirements table and total requirements table. After executing the Selection 4, you may then run impact assessment scenarios. The following screen will appear after choosing Selection 4.



Procedure 4 asks if you have price updated the Make table. Most likely, you would answer N (no). However, if you have created a new price vector (GULFPRC.DAT), you would respond with Y (yes). The next question involves the creation of new direct requirements and total requirements tables for the Coastal Areas. After you are finished creating all the new I/O tables for the Coastal Areas, enter the 0 selection or the "STOP" command.

To exit SAM, enter the command STOP after the SAM> prompt. The program may ask if you wish to save a file that you have recently changed. This message only appears as a precaution if you have modified a file and have not saved it. After you answer either YES or NO, the program will return you to the P-E operating system.

IV. Commands

IV.A. Summary of Commands

SAM contains over 30 options for 1) data management, 2) input-output modeling, 3) economic impact assessment, and 4) data transfer from/to micro software programs. SAM is designed to be user friendly with "HELP" screens available for any program command or sub-command. The HELP command can be issued at any point resulting in the appropriate information to help you continue on with the impact assessment.

The various commands available in SAM are summarized below in alphabetical order. This section provides a full explanation of each of these commands.

ADJUST: The ADJUST option checks a transactions table for negative values in the final demand column.

APPEND: The APPEND option allows the user to augment to the current matrix.

APPROX: The APPROX option permits the user to calculate the round-by-round impacts. The Leontief inverse may be approximated by using an infinite series of matrix multiplications.

BALANCE: The BALANCE option allows the user to balance, in an accounting sense, an input-output transactions table after interindustry transactions values have been altered. The option uses the RAS technique.

BUILD: The BUILD option allows the user to construct a matrix in memory (called the current matrix). The matrix is constructed one column at a time.

CHANGE: The CHANGE command permits the user to change an element value in a matrix (vector). The matrix (vector) must be in memory before the CHANGE command is executed.

HELP: Used to display information on any command in SAM

COLLAPSE: COLLAPSE is used to collapse rows or columns of a matrix (vector). The matrix (vector) to collapse must first be in memory before the command COLLAPSE is invoked.

DELETE: The DELETE command is used to delete rows, columns, or elements from a matrix (vector). The file must be in memory before the DELETE command can be used.

GET: GET is the command for retrieving files from disk. Data may be retrieved from any disk or directory. A variety of data formats may be read directly.

INFO: INFO is used to display information on the matrix currently used.

INSERT: The INSERT command is used to insert an element value into a row or column of a matrix (vector). This is helpful to correct a data column or row that was incorrectly entered. This command performs similar to the DELETE ELEMENT command.

L-INVERSE: This option creates the total requirements table from a direct requirements table using the Leontief inverse.

MACRO: The MACRO command permits the user to execute a series of commands contained in a standard ASCII text file. All commands which are executable from the keyboard are executable from a macro file (Generally, the macro files have an extension of .MAC.)

MATH: The MATH option is used to perform a variety of matrix, vector, and scalar operations on the current matrix.

MOVE: The MOVE option permits the user to move a row or column to another location.

MULTIPLIER: The MULTIPLIER option permits the user to calculate a variety of input-output multipliers. Each of the five multipliers may be calculated with the household sector endogenous (Type II or Total) or with the household sector exogenous (Type I or Simple). The user can choose to calculate the Leontief inverse or retrieve the inverse from the file. Further detail on the various multipliers is provided in the next section and in the HELP facility. To invoke the HELP command, type the word HELP followed by the name of the multiplier; for example, HELP INCOME.

NORMALIZE: The NORMALIZE command is used to calculate a direct requirements coefficient table or a direct input coefficients table from a transactions table.

PRINT: The PRINT command is used to write a matrix to the printer or a ASCIIfile. The output can be formatted in a variety of ways, which is explained in the next section.

REGIONAL: The REGIONAL command allows the user to create a regional direct requirements or regional transactions table using a variety of standard methods. The methods are noted in the following section.

SAVE: SAVE is the command for storing files onto a disk. Data may be stored onto any disk or directory. A variety of data formats may be used, which are noted later.

SUM: The SUM option permits the user to sum rows or columns and include the totals in the current matrix. The SUM ROWS option will place the new totals as the last row in the matrix. The SUM COLUMNS option will place the totals as the last column in the matrix.

TYPE: The TYPE command is used to write a matrix to the monitor or a ASCII file. The output can be formatted in a variety of ways, which is noted in the following section.

IV.B. Explanation of SAM Commands

The various commands and options available in SAM are explained in the following pages. Much of what is presented here is also available as help screens. The use of help screens is explained later as one of the options, which is the HELP option.

ADJUST

Purpose : The ADJUST option checks a transactions table for negative values in the final demand column.

Syntax : ADJUST

Remarks :

This option assumes that there is only one final demand column and that it is the next-to-last column in the table. The gross outputs are assumed to be in the last column. This option lists all the sectors which have a negative final demand. You are given the option to change these negative final demand values to positive values. Any changes are proportionally reallocated across the endogenous sectors so that row sums will still be equal to sector gross outputs.

Examples:

18	10	8	28	12	14	30	120
9	8	11	13	4	4	6	55
11	6	12	24	2	3	12	70
15	5	10	5	5	10	-10	40
20	4	7	24	17	3	5	80

```
SAM> ADJUST
Row 4 needs adjustment.  Final Demand value is -10.00.
Enter the row number you want to adjust.
ADJUST> 4
Enter the adjustment factor.
ADJUST> 0.0
No data adjustment is needed.  Enter STOP at the
next question.
ADJUST> STOP
```

This results in the following matrix:

18	10	8	28	12	14	30	120
9	8	11	13	4	4	6	55
11	6	12	24	2	3	12	70
12	4	8	4	4	8	0	40
20	4	7	24	17	3	5	80

APPEND

Purpose : The APPEND option allows you to augment to the current matrix:

1. A column vector of data on the right side,
2. A row vector of data on the bottom side,
3. A matrix on the right side, or
4. A matrix on the bottom side.

Syntax :

```
APPEND [ ROW    ]   values
       [ COLUMN ]

       [ MATRIX ]  [ row    ]   filename
                   [ column ]
```

Remarks :

- ROW - Append a new row of data onto the bottom of the current matrix.
- COLUMN - Append a new column of data onto the right side of the current matrix.
- VALUES - These are decimal numbers to fill the bottom row or last right column cells.
- MATRIX - Append a matrix onto the current matrix.
- row - The new matrix 'filename' will be appended row wise (bottom side) to the current matrix.
- column - The new matrix 'filename' will be appended column wise (right side) to the current matrix.
- filename - This is the name of a matrix on the disk to be appended to the current matrix.

Row and column vector appending permits you to enter data from the terminal or from any row or column of a file on disk (see the GET command for vectors). The option keeps repeating to allow you to enter more columns or rows of data. To exit the option, enter the command STOP.

Matrix appending does not require conformity. The matrix requires the number of rows and columns needed to store the augmented matrices. If the matrices are not conformable, the undefined regions are filled with zeros. This option is very useful when joining together sub-parts of multiregional or interregional input-output models.

A STOP command will return you to the main program with the familiar "What option would you like?" question.

Examples:

Suppose your current matrix has 3 rows and 4 columns and a file on disk named test.dat has 4 rows and 3 columns.

current matrix

12	13	21	31
9	6	3	0
15	16	27	28

test.dat matrix

45	54	67
12	32	21
78	84	65
5	2	6

Statements	Explanation
APPEND ROW 10 20 30 40	Add a row. You would be expected to enter four values from the terminal. The result of this operation would be the matrix below.

12	13	21	31
9	6	3	0
15	16	27	28
10	20	30	40

APPEND COLUMN GET TEST.DAT COLUMN 3

Add a column. The data from column 3 of TEST.DAT will be appended to the current matrix. Notice that the extra data point in column 3 of TEST.DAT was not needed. The result of this operation would be the matrix below.

12	13	21	31	67
9	6	3	0	21
15	16	27	28	65

APPEND COLUMN GET TEST.DAT ROW 2

Add a column. The data from row 2 of TEST.DAT will be appended to the current matrix. Notice that the second row of TEST.DAT is transposed before it is appended onto the current matrix. The result of this operation would be the matrix below.

12	13	21	31	12
9	6	3	0	32
15	16	27	28	84

APPEND MATRIX COLUMN TEST.DAT

Append a matrix (TEST.DAT) on the right side of the current matrix. The current matrix now has 4 rows and 7 columns.

12	13	21	31	45	54	67
9	6	3	0	12	32	21
15	16	27	28	78	84	65
0	0	0	0	5	2	6

APPEND MATRIX ROW TEST.DAT

Append a matrix (TEST.DAT) on the bottom of the current matrix. The current matrix now has 7 rows and 4 columns.

12	13	21	31
9	6	3	0
15	16	27	28
45	54	67	0
12	32	21	0
78	84	65	0
5	2	6	0

Errors :

1. INVALID NUMBER 'xxxx'. PLEASE REENTER A CORRECTED VALUE.
   The value entered 'xxxx' probably has invalid characters in it. An invalid character is anything other than the numbers 0-9 or a decimal point. It is also possible that the word GET was spelled incorrectly.

2. DATA FILE 'XXX' CANNOT BE LOCATED.
   The name of the matrix on disk to retrieve data from on an APPEND ROW or APPEND COLUMN command cannot be located on the disk drive and Volume ___ chosen. Be sure that the drive, Volume ___, file name, and extension are correctly specified. See the P-E manual for more information on the naming convention of P-E files.

3. FILE NOT FOUND.
   The matrix to be appended to the current matrix on a APPEND MATRIX command cannot be located on the disk drive and Volume ___ chosen. Be sure that the drive, Volume ___, file name, and extension are correctly specified. See the P-E manual for more information on the naming convention of P-E files files.

4. THE MAXIMUM NUMBER OF ROWS OR COLUMNS MAY NOT BE EXCEEDED. MAX=XXX
   You may not have more than 550 rows or columns.

APPROX

Purpose : The APPROX option permits you to calculate round-by-round impacts. The Leontief inverse may be approximated using an infinite series of matrix multiplications. The APPROX option permits you to follow the round-by-round procedure one step at a time. The Leontief inverse may be approximated by:

$(I-A)-1 = I + A + A2 + A3 + \ldots$

Syntax : APPROX

Remarks :

The option permits you to change the direct requirements table between rounds. The program prompts you by asking if you wish to STEP, RUN, OPTIONS, or STOP.

STEP - Calculates one round ahead.
RUN - Calculates 20 rounds ahead.
STOP - End execution of the APPROX option.

A summary of the total output and the change in total output is printed after every run or step. The program is limited to 100 rounds. The OPTIONS command permits you to DETAIL, NODETAIL, SAVE, CHANGE, or STOP.

DETAIL - Enables the printing of the marginal sector impacts matrix after every run or step.
NODETAIL- Disables the printing of the marginal sector impacts matrix.

CHANGE - Permits you to change any direct requirements coefficient.
SAVE - Permits you to save on disk three different matrices. These matrices may be saved after any round. The files can be stored in the default SAM data format, the .DIF format, or the .PRN format. See the GET command for further detail on the data formats.

DIRECT : current direct requirements table
IMPACT : marginal sector impacts matrix
TOTAL : matrix of totals

Example : Suppose that you have a three sector endogenous direct requirements table. Let's also suppose that production for sector 1 increased by $10,000.
(APPROX 1 10000 STOP)

Direct Requirements

	1	2	3
1	.150	.182	.114
2	.075	.145	.157
3	.092	.109	.171

Using the DETAIL option, the marginal impacts matrix will be printed. After the second round (using STEP twice), the tables below would be printed.

Marginal Impacts Matrix

	1	2	3
1	225.000	136.500	104.880
2	112.500	108.750	144.440
3	138.000	81.750	157.320

SUCCESSIVE APPROXIMATIONS

	1	2	TOTAL
1	1500.000	466.380	11966.3800
2	750.000	365.690	1115.6900
3	920.000	377.070	1297.0700

The RUN option will print only the twentieth round for the marginal impacts matrix if the DETAIL option was chosen.

The OPTION CHANGE command can be used before any round. The CHANGE asks for the row number, column number, and the new Aij value for the direct requirements table. This option is useful when there is a priori reasons for assuming that certain direct requirements coefficients are not stable during a shock.

BALANCE

Purpose : The BALANCE option allows you to balance, in an accounting sense, an input-output transactions table after interindustry transactions values have been altered. This option uses the RAS technique.

Syntax : BALANCE

Remarks : The program will inquire you to enter the following control totals.

1. Row control totals.
2. Column control totals.

These totals can be entered directly from the keyboard or they can be retrieved from any row or column of a data file on disk by using the GET command. (Enter the GET command when it asks for the totals.)

Once the control totals have been entered, the program responds by stating that "THE MATRIX IS NOW BALANCED." This message is followed by a series of questions that require a user response. These questions are:

1. Do you want the new row totals column and the column totals row included as part of your new matrix?
2. Do you want the control totals included as part of your new matrix?
3. Do you want the row totals column and column totals row and differences printed?

To avoid answering any of these questions, the STOP option can be issued after "The matrix is now balanced", which will return you to the main program and the familiar "What option would you like?" question.

The routine tests for convergence by testing if the maximum absolute change of all cells from their previous value is less than .01. If it is, the program stops execution and notifies you that the matrix is balanced. If it did not converge, the routine will iterate and test again. This will continue for 20 iterations. After the last iteration, you will be notified that the matrix did not converge.

Example : Suppose that you have a three sector endogenous transactions table with gross input equaling total gross output for each sector. Suppose the gross total outputs were 120, 55, and 70 respectively.

```
What option do you want?
SAM> BALANCE
Enter the 3 row control total values.
BALANCE> 120 55 70
Enter the 3 column control total values.
BALANCE> 120 55 70
The matrix is now balanced.
Do you want the new row totals column and column
totals row included as part of your new matrix?
BALANCE> STOP
```

before

16	8	12
7	9	11
15	6	14

after

18	10	8
9	8	11
11	6	12

Errors : 1. The balancing routine has gone through the maximum number of iterations and is not balanced within established limits.

2. This routine requires (but does not check) that the sum of the row control totals is equal to the sum of the column control totals. The procedure will not converge to a solution otherwise.

BUILD

Purpose : The BUILD option allows you to construct a matrix in memory (called the current matrix). The matrix is constructed one column at a time.

Syntax : BUILD name type number of rows data

Remarks : name - The name of the matrix to be used in printing or typing the matrix. This is not necessarily the name that the matrix will be called when saved on a disk.

type - The matrix can be one of four types.
1. Transactions (TRANSACTIONS),
2. Direct requirements (DIRECT),
3. Total requirements (TOTAL), or
4. Data matrix (DATA).

numrow -rows - The number of rows that the matrix will have in each column.

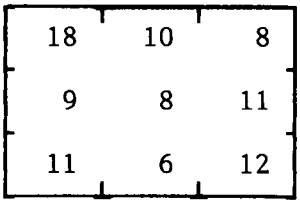
data - These are the values for each column. Data are entered one column at a time.

To leave the BUILD command, type STOP and press the return key. This will return you to the main program. Once you have returned to the main program, the computer response is "What option would you like?" To save the matrix (vector) you have just built, execute the SAVE command.

Example: Suppose you wanted to build a transactions table with 3 sectors.

```
SAM> BUILD
What name do you wish to call this matrix?
BUILD> NEBRASKA
Is this a Transaction(s), Direct Requirement(s),
Total Requirement(s), of a Data matrix?
BUILD> TRANSACTIONS
How many rows will your matrix have?
BUILD> 3
Enter the 3 values for column 1 or stop for a new
option.
BUILD >18 9 11
Enter the 3 values for column 2 or stop for a new
option.
BUILD >10 8 6
Enter the 3 values for column 3 or stop for a new
option.
BUILD >8 11 12
Enter the 3 values for column 4 or stop for a new
option.
BUILD> STOP
```

after building



CHANGE

Purpose : The CHANGE command permits you to change an element value in a matrix (vector). The matrix (vector) must be in memory before the CHANGE command is executed.

Syntax : CHANGE row column value
where
row - The row number of the current matrix
column - The column number of the current matrix
value - The new value to place in the cell.

Example:

CHANGE 1 2 3 Change row 1 column 2 to contain the value 3.

before

18	8	8
9	8	11
11	6	12

after

18	3	8
9	8	11
11	6	12

CHANGE NR NC 0.0 Change the last row and last column to 0.0. SAM interprets NR as the last row and NC as the last column.

before

18	10	8
9	8	11
11	6	12

after

18	10	8
9	8	11
11	6	0

Errors :

1. INVALID NUMBER 'xxxx'. PLEASE REENTER A CORRECTED VALUE. The value entered 'xxxx' probably has invalid characters in it. An invalid character is anything other than the numbers 0-9 or a decimal point. It is also possible that the word GET was spelled incorrectly.
2. YOUR ROW OR COLUMN SELECTION IS GREATER THAN THE NUMBER OF ROWS OR COLUMNS IN YOUR CURRENT MATRIX.

COLLAPSE

Purpose : COLLAPSE is used to collapse rows or columns of a matrix (vector). The matrix (vector) to collapse must first be in memory before the command COLLAPSE is invoked.

Syntax : COLLAPSE ¦ ROWS ¦ first last
¦ COLUMNS ¦

Remarks : ROWS - Collapse a contiguous set of rows.
COLUMNS - Collapse a contiguous set of columns.
first - First row or column of the contiguous set.
last - Last row or column of the contiguous set.

Since COLLAPSE will automatically result in a shifting or bumping of rows and columns, it is very important to keep track of these shifts. To avoid error, it is wise to begin with the higher numbered rows or columns and proceed to collapse toward the lower numbered rows or columns.

To exit the COLLAPSE command, execute the STOP option.

Examples : Suppose the current matrix has 4 rows and 7 columns

12	13	21	31	45	54	67
9	6	3	0	12	32	21
15	16	27	28	78	84	65
0	0	0	0	5	2	6

The following questions and responses are equivalent to typing COLLAPSE COLUMNS 2 5.
This will collapse columns 2,3,4,5 into column 2.
The former column 6 is now the current column 3.

```
SAM> COLLAPSE
Do you want to collapse rows or columns?
COLLAP> COLUMNS
Enter the beginning and ending columns you want
collapsed.
COLLAP> 2 5
Do you want to collapse rows or columns?
COLLAP> STOP
```

after collapsing

12	110	54	67
9	21	32	21
15	149	84	65
0	5	2	6

If you wish to collapse the matrix into a single row, then enter: COLLAPSE ROWS 1 NR .

after collapsing

36	35	51	59	140	172	159

DELETE

Purpose : The DELETE command permits you to delete rows, columns or elements from a matrix (vector). The file must be in memory before the DELETE command can be used.

Syntax : DELETE [ROWS / COLUMNS] first last

[ELEMENT] [row / column] rownum column

Remarks : first - First row or column of the contiguous set
last - Last row or column of the contiguous set
element - Delete an element from a row or column
row : Remove an element from a row. The row is then bumped left one cell by all cells to the right of the deleted cell.
column : Remove an element from a column. The column is bumped up one cell by all cells below the deleted cell.
rownum : The row number of the deleted cell.
column : The column number of the deleted cell.

Deleting an ELEMENT from the table is useful when a column or a row of numbers need to be shifted up. This deletion will remove the cell value chosen and replace it with the adjacent cell value. If ELEMENT ROW is chosen, then the cell values to the right of the deleted one are shifted left. The value on the end of the row is assigned a zero value. If ELEMENT COLUMN is chosen, then the cell values below the deleted one are shifted up. The value on the bottom of the column is assigned a zero value.

Deleting a ROW from the matrix removes all the values of the row from matrix. The number of the rows in the table are decreased by one.

Deleting a COLUMN from the matrix removes all the values of the column from matrix. The number of the columns in the table are decreased by one.

To exit the DELETE option, execute the option STOP, and the program will return you to the "What option would you like?" question.

Examples : Suppose the current matrix has 4 rows and 7 columns

12	13	21	31	45	54	67
9	6	3	0	12	32	21
15	16	27	28	78	84	65
0	0	0	0	5	2	6

The following questions and responses are equivalent to typing DELETE COLUMNS 4 NC. This will remove columns 4,5,6,7 from the matrix.

```
SAM> DELETE
Do you want to delete ROWS, COLUMNS or ELEMENTS?
DELETE> COLUMNS
Enter the beginning and ending columns you want to
delete.
DELETE> 4 7
Do you want to delete ROWS, COLUMNS or ELEMENTS?
DELETE> STOP
```

after deletion

12	13	21
9	6	3
15	16	27
0	0	0

The following example deletes an element from a matrix with row deletion. Notice that the values shift left.

```
SAM> DELETE
Do you want to delete ROWS, COLUMNS or ELEMENTS?
DELETE> ELEMENTS
Do you want to delete from a ROW or a COLUMN?
DELETE> ROW
Enter the row and column number of the value you
wish to delete.
DELETE>3 4
Do you want to delete ROWS, COLUMNS or ELEMENTS?
DELETE>STOP
```

after element deletion

12	13	21	31	45	54	67
9	6	3	0	12	32	21
15	16	27	78	84	65	0
0	0	0	0	5	2	6

GET

Purpose : GET is the command for retrieving files from disk.
Data may be retrieved from any Volume.
A variety of data formats may be read directly.

Syntax : GET vol:filename.ext

Remarks : vol: - Volume to search. This is generally AMS1:
filename - The name of the file you want to list.
ext - Extension. This is the three letters following the period after the file name.

The file name extension (the three letters following the period in a standard file name) denotes the type of file to retrieve. This permits easy transfer of data from a variety of data sources. Data that are retrieved in any of these formats may be SAVED in any of the other formats. The acceptable data formats are:

xxx.DIF - A file that is in the universal data exchange format. Data in this format are interchangeable with programs on micro computers, such as TSP and Lotus 123.
xxx.PRN - A file that is in the standard ANSII text file format. This is the standard output of Lotus 123 when it prints output to a file.
anything else - A file that is in the special SAM data format. The SAM format conserves disk space.

Examples:

GET TEST	Retrieve an SAM format file.
GET AMS1:TEST	Retrieve the file from AMS1 Volume
GET TEST.DIF DIR	Retrieve a universal data exchange format file. The file retrieved is a direct requirements table.
GET TEST.PRN 6 9 TR	Retrieve a standard ANSII text format file. The file retrieved is a transactions table with 6 rows and 9 columns.

When retrieving a .DIF file, the program responds with, "Is the data file a Transaction(s), Direct Requirement(s), Total Requirement(s), or Data matrix." Upon entering the type of data file, the options terminates with the retrieved matrix as the current matrix.

When retrieving a .PRN file, the program responds with, "Enter the number of rows and columns in the matrix." The user response determines the dimensions of the incoming matrix. Next, the program prompts the user with "Is the data file a Transaction(s), Direct Requirement(s), Total Requirement(s), or Data matrix?" If there are too many or too few data points in the xxx.PRN file to fill the matrix, the program will display the warning: "WARNING. Possible data wrap around." This warns the user that the number of rows and columns may be incorrect.

The GET option checks to see if you have manipulated the current matrix. If you have, then you will be asked if you wish to save the current matrix before a new matrix is retrieved from disk.

Errors : DATA FILE XXX CAN NOT BE LOCATED.
The file you requested was not found. This will occur if you have incorrectly spelled the file name or have miss-specified the Volume that the file is on.

INFO

Purpose : To display information on the matrix currently in memory.

Syntax : INFO

Examples:

```
SAM> GET SAMPLE.DAT

SAM> INFO
NAME : SAMPLE.DAT
TYPE : DATA
ROWS : 31
COLS : 30
MODIFIED : NO
```

Errors : none

INSERT

Purpose : The INSERT command permits you to insert an element value into a row or column of a matrix (vector). This is helpful to correct a data column or row that was incorrectly entered. This command performs exactly opposite the DELETE ELEMENT command.

Syntax : INSERT [ROW / COLUMN] rownum column value

Remarks : ROW : Inserts an element into a row. All cells to the right of the inserted cell are then shifted one cell to the right. The element in the last column of the row is lost.

COLUMN : Inserts an element into a column. The column is shifted down one cell by all cells below the inserted cell. The element in the last row of the column is lost.

rownum : The row number of the inserted cell.

column : The column number of the inserted cell.

value : The value to insert.

Once you have executed the INSERT command, the program response is "Do you want to insert into a row or column? Or, stop for a new option?" If you do not intend to insert any additional values, enter the option STOP and the program will return you to the "What option would you like?" question.

It is extremely important to know that the INSERT option will bump all values along the row (or column) starting with the value at the insert position. As to whether the bump is along a row or column depends on your response to the question "Do you want to insert into a row or a columns?" If your response is row, then the bump moves along the designated row, starting at the insert position.

Examples :

Examples : Suppose the current matrix has 4 rows and 7 columns

12	13	21	31	45	54	67
9	6	3	0	12	32	21
15	16	27	28	78	84	65
0	0	0	0	5	2	6

The following example inserts an element into row 3 and column 4 of a matrix using row insertion. Notice that the values shift right.

```
SAM> INSERT
Do you want to insert into a ROW or a COLUMN?
Or, stop for a new option?
INSERT> ROW
Enter the row number, column number, and new value.
INSERT> 3 4 100.0
Do you want to insert into a ROW or a COLUMN?
Or, stop for a new option?
INSERT> STOP
```

12	13	21	31	45	54	67
9	6	3	0	12	32	21
15	16	27	100	28	78	84
0	0	0	0	5	2	6

Other examples:

INSERT ROW 2 3 100	The value 100 will be placed in row 2 and column 3. The previous value in row 2 column 3 is now at row 2 column 4.
INSERT COLUMN 4 1 .123	The value .123 will be placed in row 4 and column 1. The previous value in row 4 column 1 is now at row 3 column 1.

L-INVERSE — LEONTIEF INVERSE

Purpose : This option creates the total requirements table from a direct requirements table using the Leontief inverse.

Syntax : L-INVERSE

Remarks : The program prompts you to see if you have removed the primary payments (and final demands) from the table. If you have not, then the matrix would be singular and the Leontief inverse does not exist. The resultant matrix is unpredictable if the matrix is singular. The program tells you to remove these sectors from the table and try again. If the table is not a DIRECT requirements or a DATA matrix, then you will receive a warning message. You may proceed, but the option only makes sense for a direct requirements table.

The Leontief inverse is defined by:

$\alpha = (I-A)$
(If you want to calculate a normal inverse of a matrix, use the MATH option.)

MACRO

Purpose : The MACRO option permits you to execute a series of commands contained in a standard ASCII text file. All commands which are executable from the keyboard are executable from a macro file. (Generally, the macro files have an extension of .MAC .)

Syntax : MACRO macname arg1 arg2 ... arg9

Remarks : macname - The name of a ASCII text file that lists the commands to be used.
argn - These arguments can be any information you want to pass to the macro. The %n variables are assigned the values of these arguments. %0 is assigned to arg1, %1 is assigned to %1, etc.

The list of commands noted below are generally used only in macros.

Assign	Echo
Exit	If
Increment	Goto
Message	Prompt
Shift	

ECHO on¦off : This option turns on or off the listing on the screen of the questions prompted by the program. An ECHO OFF is issued when a macro is executed. This inhibits the listing of questions and prompts on the monitor. If you wish to trace the execution of the macro, use ECHO ON. An ECHO ON is automatically executed upon completion of the macro.

EXIT : This option halts the execution of a macro. An ECHO ON is issued. The control returns to the keyboard.

IF : The IF command is a very powerful macro command, which permits you to compare or test characters to characters or numbers to numbers. The IF command follows the exact same syntax as the ASCII batch IF statement. The two forms of syntax are :

1. IF arg1 operator arg2 other commands ....

where
arg1, arg2 : any character or number.

operator	meaning	
==	equal :	character only
=	equal :	number only
>	greater than	number only
<	less than	number only
<>	not equal to	number only
≥ or >=	greater than or equal to	number only
≤ or <=	less than or equal to	number only

2. IF AIJ row column operator num1 commands ...

where

AIJ : Denotes that an element in the current matrix will be examined. The program will permit the AIJ on either side or both sides of the operator.

row : The row of the current matrix.

column : The column of the current matrix.

operator : The relational operator.

num1 : A number to be compared.

commands : These can be any SAM commands. If the condition tested is true, then these commands are executed. If the condition is false, then the macro proceeds to the next line.

Examples of the IF statement	Description
IF 123 > 65 TYPE YES	Obviously true. The entire matrix will be displayed on the screen.
IF 123 ≥ %3 TYPE YES	The prompt variables %n may be used.
IF NR ≥ 15 DELETE R 1 NR STOP	The NR and NC special variables may be used. (number of rows and number of columns)
IF %2 == NEBRASKA EXIT	Character comparison.
IF AIJ 1 2 > 123 TYPE Y	IF A(I,J)>123 type the matrix.

```
IF AIJ NR NC ≤ AIJ %1 %2  EXIT   This uses the NR, NC, and
                                 %n special codes while
                                 comparing matrix cells.
```

ASSIGN : This option permits the user to assign any value or word to a %n variable.

Syntax : ASSIGN %n value

Remarks : n=0,1,2, ... 9

Examples of the ASSIGN statement

```
ASSIGN %1 123.456      The %1 holds the value 123.456

ASSIGN %4 NEBRASKA     The %4 holds the word NEBRASKA

ASSIGN %2 AIJ 2 3      the %2 holds the contents of
                       the cell of the current matrix.
```

INCREMENT: This option permits the user to increment a %n variable by any amount. The current contents of %n must be a number.

Syntax : INCREMENT %n value

where
%n - The variable to increment.
value - The value to increment with..

Example of the INCREMENT statement

```
ASSIGN    %1 123.456    Assign a number to %1

INCREMENT %1 15         Increment %1 by 15

INC       %2 %1         Since %1 contains a
                        number it can be used as
                        an increment.

INCREMENT %3 123        May not be valid if
                        %3=NEBRASKA.
```

If the contents of %n is not a number, the program will ask for a valid number and then stop execution.

```
INCREMENT %3 AIJ %1 %2  Increment %1 with the cell
                        value row %1 & column %2
                        of the current matrix.
```

MESSAGE : This option permits the user to display his/her own message to the terminal. This is particularly useful in documenting output. This is also used in displaying a question with a PROMPT %n command. The message command tells the program to read the next line of the macro and display it as a message. The message line may contain the %n variables. These variables are substituted with the contents of the variables.

Examples of the MESSAGE statement

```
ASSIGN %1 NEBRASKA MESSAGE
The %1 income multipliers are:
The NEBRASKA income multipliers are:

ASSIGN %2 12 ASSIGN %3 nr message
Sector %2 out of %3 sectors.
Sector 12 out of 165 sectors.
```

PROMPT : This option interrupts the macro execution to receive input from the terminal after a question from another command is asked.

Remarks : The advantage of this command is that you do not need to know the name of a data file at the time the macro is written. The same macro can be used to perform the same calculations on a variety of data files.

PROMPT %n : This option is different than the PROMPT command by itself. This option interrupts the macro execution for input to be entered from the keyboard. The response is stored in %n, where n = 0,1...9. (example PROMPT %2).

Remarks : The %n variables can hold any number or name. These can be used in response to a MESSAGE statement.

At the PROMPT %n command, the SAM question is answered with a response. The following two statements are equivalent. The second %4 in the example below answers the GET question, "What file do you wish to get?"

```
GET PROMPT TYPE Y          GET PROMPT %4 %4 TYPE Y
```

In the macro below, the questions are set off and the message "Enter the coefficient table name." is displayed on the monitor. The user enters a name of a table from the disk drive. This is assigned to the variable %0. The %0 variable can be used at any time. The file is retrieved, and total requirements are calculated and saved in place of the old file.

```
ECHO OFF MESSAGE
Enter the coefficient table name.
GET %0
TOTAL YES
SAVE %0 YES
EXIT
```

In the next example, a file is retrieved and the total requirements are calculated. The SAM message "What file do you wish to get?" is displayed. The user responds with the file name. This PROMPT statement does not use the %n parameter.

MATH

Purpose : The MATH option permits you to use a variety of matrix, vector, and scalar operations on the current matrix.

Syntax : MATH operation parameters

Remarks : Most operations have a specific set of parameter accompanying it. The math option provides six matrix operations. The operation symbols are listed below.

+	The addition by a scalar, vector or matrix.
-	The subtraction by a scalar, vector or matrix.
*	The multiplication by a scalar, vector or matrix. (The matrix in memory is post multiplied by the matrix on disk.)
/	The division by a scalar, vector or matrix (element wise). If the division is by 0.0, then the result is 0.0.
inverse	- The inverse of a square matrix.
transpose	- The transpose of a matrix.
reverse	Reverses the order of operation (A - 1,), which becomes (1 - A).

. For VECTOR and SCALAR operations, you must enter the first row, last row, first column, and last column you wish to operate on. These four values specify a sub-matrix of the current matrix. Vector operations are performed by ROWS or COLUMNS. The row operation will take the first element of the vector and operate on each element of the first row. The second element of the vector will be operated on each element of the second row. This continues for the entire range of rows selected. The column operation is very similar to the row operation except the columns are operated by the vector elements. The scalar operation multiplies the entire sub-matrix.

. Once the math operation has been performed, the program remains in the MATH option so that, if needed, additional math operations can be performed. If you need further explanation, go through the option step-by-step and read the questions.

Examples:

.Examples	Explanation
MATH * VECTOR	Use vector multiplication.
1 2	Starting and ending rows.
1 2	Starting and ending columns.
100 200.2	Vector of values to use in multiplication.
MATH * MATRIX	Use true matrix multiplication.
test.dat	Enter the name of a file on disk to post multiply by.

. There is a special matrix always in memory called IDENTITY. Its dimensions are the same as the currently held matrix. To calculate the Leontief inverse of a direct requirements table in memory, enter:

MATH REVERSE - MATRIX	This string of commands will subtract one matrix from another in reverse order, where the "Identity" matrix is always present.
INVERSE	In the example, INVERSE will calculate the inverse of (I-A).
MAT / M TEST.DAT	Using abbreviations. Elementary division of the current matrix by elements of TEST.DAT
MAT - SC 1 NR 1 NC .5	Subtract .5 from the entire matrix.

current matrix

12	13	21	31
9	6	3	0
15	16	27	28

test.dat matrix

45	54	67
12	32	21
78	84	65
5	2	6

MOVE

Purpose : The MOVE command permits you to move a row or column to another location.

Syntax : MOVE [ROW / COLUMN] origin destination

Remarks : ROW - Select to move a row
COLUMN - Select to move a column
origin - The number of the row or column you want to move
destination - The definition of the row or column.
The origin row or column will be moved to precede the row or column that currently holds the position.

Examples : MOVE ROW 3 1 Moves row three to occupy row one.

18	4	8
9	11	14
11	6	12

11	6	12
18	4	8
9	11	14

MOVE COLUMN 2 3 Moves column two to three

18	4	8
9	11	14
11	6	12

18	8	4
9	14	11
11	12	6

Block Movements:

The move command only moves one row or column at a time. The macro on the following page may be written in a standard ASCII text file to move contiguous groups of rows or columns. Be sure to capitalize all the words that are capitalized in the macro. The IF comparisons distinguish between upper and lower case answers. Be sure to respond to the questions the macro asks when it is executed as capital letters.

```
          MESSAGE
          Do you wish to move a ROW or COLUMN group?
          PROMPT %1
          IF %1 == STOP   EXIT
          MESSAGE
          Enter the beginning %1 number.
          prompt %2
          MESSAGE
          Enter the ending %1 number.
          prompt %3
          MESSAGE
          Enter the destination %1 number.
          prompt %4
          IF %1 == ROW    IF %2 <= %3 IF %3 <= NC GOTO  TOP
          IF %1 == COLUMN IF %2 <= %3 IF %3 <= NC GOTO  TOP
          MESSAGE
          Invalid entries: Method=%1 starting=%2 ending=%3
destination=%4
          EXIT
          :TOP
          MOVE %1 %2 %4 STOP
          IF %2 = %3 EXIT
          IF %2 < %4 INC %3 -1 GOTO TOP
          INC %2 1
          INC %4 1
          GOTO  TOP
```

MULTIPLIER

Purpose : The multiplier option lets you calculate a variety of input-output multipliers. Each of the five multipliers may be calculated with the household sector endogenous (Type II or Total) or with the household sector exogenous (Type I or Simple). You may choose to calculate the Leontief inverse or retrieve the inverse from the file. Further detail on the various multipliers is provided in the HELP facility. Type the word HELP followed by the name of the multiplier. i.e. HELP INCOME

Syntax : MULTIPLIER choice

Remarks : The following multipliers may be calculated with this option:

EMPLOYMENT	: Standard employment multipliers
INCOME	: Standard income multipliers
OUTPUT	: Standard output multipliers (sometimes call the final demand multipliers)
SUPPLY	: Standard supply multipliers
INDUSTRY	: Industrial output multipliers (different than the OUTPUT multipliers)

All the TYPE II or TOTAL multipliers assume that the household sector is endogenous. Any sector after the household sector is considered exogenous. Both Type I and Type II income multipliers must have the household row included.

Output Multipliers:

An output multiplier for sector j is defined as the total value of production in all sectors of the economy that is necessary in order to satisfy a dollar's worth of final demand for sector j's output.

The easiest way to calculate the output multiplier is to sum the columns of the total requirements table. The total requirements table is calculated by taking the Leontief inverse of the direct requirements table. The bar upon the matrices denotes the truncation of the household sector. This is demonstrated in the following two steps:

Total	Simple
1. $\alpha = (I-A)^{-1}$	$\bar{\alpha} = (I-\bar{A})^{-1}$
2. $Oj = \sum_{i=1}^{n} \alpha(i,j)$	$\bar{O}j = \sum_{i=1}^{n} \bar{\alpha}(i,j)$.

Income Multipliers:

An income multiplier for sector j is defined as the total change in income in all sectors of the economy associated with a one dollar change in income for sector j.

Type II multipliers rely on the household row for income coefficient information. This row forms a diagonal matrix (y). The Type I multipliers use a truncated household row. The last element of (y) is removed forming the matrix (ÿ). The matrix which includes the household sector as endogenous is (A). The matrix which treats the household sector as exogenous is (Ä). The multipliers are calculated as follows:

Type II	Type I
$Yj = \sum_{i=1}^{n} \left[I-(y * A * y^{-1}) \right]^{-1}$	$\bar{Y}j = \sum_{i=1}^{n-1} \left[I-(\ddot{y} * \ddot{A} * \ddot{y}^{-1}) \right]^{-1}$

Employment Multipliers:

An employment multiplier for sector j is defined as the total change in employment in all sectors of the economy associated with one unit of employment change in sector j.

Type II multipliers are based on physical labor input coefficients. This vector of inputs must be entered from the keyboard or from a data file using the GET option. These physical labor input coefficients form a diagonal matrix (e) for the Type II multipliers. Type I multipliers truncate the household sector from (e) and form (ê). The matrix which includes the household sector as endogenous is (A). The matrix which treats the household sector as exogenous is (Ä). The multipliers are calculated as follows:

Type II	Type I
$Ej = \sum_{i=1}^{n} \left[I-(e * A * e^{-1}) \right]^{-1}$	$\bar{E}j = \sum_{i=1}^{n-1} \left[I-(\ddot{e} * \ddot{A} * \ddot{e}^{-1}) \right]^{-1}$

Industry Multipliers:

Industry multipliers are not the same as the standard output multipliers. An industry multiplier for sector j is defined as the total value of production in all sectors of the economy that is necessary in order to satisfy one dollar's worth of output for industry j.

The industry multipliers can be derived from the standard output multipliers. The HELP OUTPUT screen gives greater detail on the terminology.

Type II		Type I
$Ij = Oj \;/\; \alpha(j,j)$	or	$\bar{I}j = \bar{O}j \;/\; \bar{\alpha}(j,j)$

The result for every element in the total requirement industrial output matrix is:

$\Phi(i,j) = \alpha(i,j)/\alpha(j,j)$ for all i,j=1,2..n

Supply Multipliers

Supply multipliers assume that if production of industry i doubles, sales from that industry to every other purchasing industry doubles. The standard transactions table is normalized across the rows using gross outputs (or gross requirements). This creates the direct-input coefficients table. Ä is the direct-input coefficients table, where the household sector is endogenous. Ä is the direct-inputs coefficients table, where the household sector is exogenous.

	Type II	Type I
1.	$\alpha = (I-Ä)\text{-}1$	$\alpha = (\bar{I}-Ä)\text{-}1$
2.	$Si = \sum_{j=1}^{n} \alpha(i,j)$.	$\bar{S}i = \sum_{j=1}^{n} \bar{\alpha}(i,j)$.

NORMALIZE

Purpose : The NORMALIZE option permits you to calculate a direct-requirements coefficients table or a direct-input coefficients table from a transactions table.

Syntax : NORMALIZE [ROWS / COLUMNS]

Remarks : ROWS - The rows will be normalized to sum to 1.0. The total of the rows may either be in the last column of the table or calculated by the option.

COLUMNS - The columns will be normalized to sum to 1.0. The total of the columns may either be in the last row of the table or calculated by the option.

To create a direct-requirements coefficients table, you must normalize columns using total gross requirements. Total gross requirements are assumed to be recorded in the last row of the table. If they are not in the last row of the table, then the program will sum each column to create the totals. (If the table does not have the totals row or primary payments sectors included, then the MATH option will have to be used to generate the direct requirements, where the operation is MATH VECTOR / COLUMNS 1 NC. The totals would then have to be entered by hand or with the GET option. The GET option permits you to extract any row or column from a table on the disk.)

To create a direct-input coefficients table for a supply-side I/O model, you must normalize rows using total gross outputs. Total gross outputs are assumed to be recorded in the last column of the table. If they are not in the last column of the table, then the program will sum each row to create the totals. If the table does not have the totals or the final demand sectors included, then the MATH option will have to be used to generate the direct-input coefficients, where the operation is MATH VECTOR / ROWS 1 NR .

Examples: Suppose the current matrix was a three sector transactions table that included final demands and primary payments but did not have the gross total outputs or gross total requirements in the table. To calculate the direct requirements table, the transactions table would have to be normalized using column sums. The program would automatically calculate the column totals.

```
SAM> NORMALIZE
Do you want to use ROW or COLUMN totals to adjust
the matrix?
NORMAL> COLUMN
Are the ROW totals included in the matrix?
NORMAL> NO
```

transaction table

51	6	0
17	30	18
17	24	72
85	60	90

direct requirements

.6	.1	0
.2	.5	.2
.2	.4	.8

Suppose your current matrix is a transactions table with 3 rows and 4 columns, with the forth column being the total gross outputs for each sector. To calculate the direct-output coefficient table, the transactions table would have to be normalized across rows.

```
SAM> NORMALIZE
Do you want to use ROW or COLUMN totals to adjust
the matrix?
NORMAL> ROW
Are the ROW totals included in the matrix?
NORMAL> YES
Enter the column number of the row totals.
NORMAL> NC                {see 'SPECIAL' characters
                           NC=4 for this matrix.}
```

transactions table

16	24	40	80
30	0	45	75
5	35	10	50

direct-outputs

.2	.3	.5
.4	0	.6
.1	.7	.2

PRINT

Purpose : The PRINT command allows you to write a matrix to the printer or a ASCII file. The output is can be formatted in a variety of ways.

Syntax : PRINT [YES]
[NO] no-parameters
[FORMAT] format-parameters

Remarks : YES - Print the entire matrix. This is a response to the question, "Do you want to print the entire matrix?" The matrix will be printed immediately. No form feed is performed before or after the matrix is printed.

NO - Only part of a matrix is to be printed. The program will then request you to "Enter the beginning and ending rows you want to print" and "Enter the beginning and ending columns you want to print." This forms a sub-matrix to print. If you want to print rows 2 through 5 and columns 1 through 2, you would enter print no 2 5 1 2 .

FORMAT - The FORMAT option permits you to change a variety of print parameters for a more attractive display of the current matrix. The format options are listed below.

COLUMN : Set the number of columns to be printed on a page. (Default is 5 columns.)

WIDTH : Set the number of characters (digits) to be printed for each of the columns. All columns have the same width. (Default is 15 digits.)

LENGTH : Set the number of lines per page. The program will print more than one table per page if there is room. If there is not enough room, the program sends a hard top-of-the-page control code to the printer. This advances the printer to the top of the page. (Default is 66 lines per page.)

DECIMAL: Set the number of decimal points to be displayed in printing. This does not limit in any way the precision of the stored numbers. (Default is 5 decimal points.)

HEADER : Allows up to 3 lines of text for the title. To center the title, use the ¦ character as the first character in the header. The title will be centered according to the COLUMN & WIDTH settings. The special variables %n may be used in the headers. (Default header displays the matrix name and the type of input-output table that it is.)

FOOTER : Allows only one line of text as a footer. Centering is also permitted by using the ¦ character in the first character of the footer. (Default is a blank line.)

CLEAR : Returns the HEADERs and FOOTER to the blank. The default title will be set to the name and type of the matrix.

DEFAULT: Returns all FORMAT specifications to the initial settings. These setting are listed after every format option.

STATUS : Lists the format settings.

SETUP : Sends a setup string to the printer. This is helpful for initializing special features on the printer. The values are entered as decimal numbers between 0 and 255. Up to 30 values may be entered. The SETUP option will prompt for more values until the STOP command is entered. On an IBM dot matrix printer, for example, you may wish to:

1) use the emphasis mode,
2) use wide character set, and
3) set the number of lines on a page to 33.

In this case you would enter:
SETUP 27 70 27 87 1 27 67 33 STOP

FILE : Send the output to a ASCII file instead of the printer or monitor. The file may be modified by an file editor or word processor. The file follows the standard ASCII file description of drive:\path\fname.ext .
(example A:TEST or C:\SAM\NEBRASKA.AIJ)
If there is already a file with the same name as the one to be printed, the file on the disk is automatically erased.

Examples : Suppose that the current matrix has 20 rows and 10 columns. To print the entire matrix using the default format setting, you would enter:

```
SAM> PRINT YES
```

To print the same matrix but only columns 5 through 9 and rows 8 through the end, you would enter:

```
SAM> PRINT NO 8 NR 5 9
```

To change the number of columns per page to 10, the column widths to 6 digits, the number of decimal places to 1, a heading of "Nebraska 1986 Direct Requirements Table", and print the entire matrix, you would enter:

```
SAM> PRINT FORMAT
Enter the format option : Columns, Decimal, Length,
Width, Header, Footer, Setup, Default, Clear, File,
Status or Stop.
PRINT > COLUMNS
Enter the number of Columns per page. (currently=5)
PRINT > 10
Enter the format option: ....
PRINT > WIDTH
Enter the column width. (currently=15)
PRINT > 6
Enter the format option: ....
PRINT > DECIMAL
Enter the number of decimal points to display in
the data. (currently=5)
PRINT > 1
Enter the format option: ....
PRINT > HEADER
Enter the Heading for line number you want to
change. (or, stop).
PRINT > 1
Enter the Heading for line number 1
PRINT > Nebraska 1986 Direct Requirements Table
Enter the format option: ...
PRINT > STOP
Do you want to print the entire matrix?
PRINT > YES
```

This entire conversation with the computer can be entered on a few lines using abbreviations. The program will not prompt you with questions for commands entered on the same line.

```
SAM> PRINT FORM COL 10 WID 6 HEAD 1
Enter the Heading for line number 1
PRINT > Nebraska 1986 Direct Requirements Table
Enter the format option: ...
PRINT > STOP YES
```

REGIONAL

Purpose : The REGIONAL command allows you to create a regional direct requirements or regional transactions table using a variety of standard methods. The methods available are:

SLQ - Simple location quotients
CIQ - Cross industry quotients
PLQ - Purchase only location quotients
SDP - Supply demand pool approach
RAS - Partial survey information adding technique

SLQ : Simple Location Quotients
The simple location quotient for sector i in region R is defined as:

$$SLQ(R,i) = \left[\frac{X(R,i)/X(R)}{X(N,i)/X(N)} \right]$$

X(R,i) - Regional gross output (or activity) of sector i.

X(R) - Regional total gross output (or total activity).

X(N,i) - National or reference economy gross output (or activity) of sector i.

X(N) - National or reference economy total gross output (or total activity).

The regional aij coefficients (Raij) are transformed from the national (or reference economy) aij coefficients (Naij) using:

Raij = Naij * SLQ(R,i,j) if SLQ(R,i,j) < 1
Raij = Naij if SLQ(R,i,j) ≥ 1

CIQ : Cross-Industry Location Quotients
The cross-industry location quotient selling sector i and buying sector j in region R is defined as:

$$CIQ(R,i,j) = \left[\frac{X(R,i)/X(N,i)}{X(R,j)/X(N,j)} \right]$$

X(R,i) - Regional gross output (or activity) of sector i
X(N,i) - National or reference economy gross output (or activity) of sector i

The regional aij coefficients (Raij) are transformed from the national (or reference economy) aij coefficients (Naij) using:

$$Raij = Naij * CIQ(R,i,j) \quad \text{if } CIQ(R,i,j) < 1$$
$$Raij = Naij \quad \text{if } CIQ(R,i,j) \geq 1$$

PLQ : Purchase-Only Location Quotients
This method is identical to the SLQ method except the totals used for each sector i are calculated only for those industries purchasing from i. The program calculates the totals for each sector. The purchase-only location quotient for sector i in region R is defined as:

$$PLQ(R,i) = \left[\frac{X(R,i)/X^{\circ}(R)}{X(N,i)/X^{\circ}(N)} \right]$$

X(R,i) - Regional gross output (or activity) of sector i
X°(R) - Regional total gross output (or total activity) for those sectors using i as an input.
X(N,i) - National or reference economy gross output (or activity) of sector i
X°(N) - National or reference economy total gross output (or total activity) for those sectors using i as an input

The regional aij coefficients (Raij) are transformed from the national (or reference economy) aij coefficients (Naij) using:

$$Raij = Naij * SLQ(R,i,j) \quad \text{if } SLQ(R,i,j) < 1$$
$$Raij = Naij \quad \text{if } SLQ(R,i,j) \geq 1$$

SDP : Supply-Demand Pool Approach
The supply demand pool technique adjusts the reference economy aij coefficients to reflect the region's ability to supply the commodities which are demanded in the region. If the region is unable to supply the total regional demand for input j, then an adjustment is made. If it can internally meet the demand (and possibly export), then no adjustment is made to the coefficients. This approach is based on a reference economy's direct requirements table that

includes the endogenous and final demand sectors. The program will ask for the regional total gross output for each sector,X(R,i) and for final demands Y(f). The SPD uses three steps in regionalization.

1. Uses a reference economy as an initial estimate of the direct requirements coefficients (Naij);

2. Estimates the regional output for each sector using Naij; and

3. Derives the regional commodity balance (Bj).

The regional output is estimated using:

$$X^{\circ}(R,i) = \sum_{j=1}^{n} Naij * X(R,i) + \sum_{f=1}^{n} Naif * Y(f)$$

The regional commodity balance is calculated using:
$Bj = X(R,i) - X^{\circ}(R,i)$

The regional direct requirements are estimated using:
$Raij = Naij * (X(R,i)/X^{\circ}(R,i))$ if $Bj < 1$
$Raij = Naij$ if $Bj \geq 1$

RAS : RAS is a partial survey technique which "balances" the direct requirements table of a reference economy with actual survey data.

The iterative RAS technique requires three series of numbers:

1. Total gross outputs for each sector by sector i (Xi);
2. Total interindustry (intermediate) sales by sector i (Ui); and
3. Total interindustry (intermediate) purchases by sector i (Vi).

After the program has iterated for 10 times, it displays the mean absolute deviation for the entire table and the maximum single cell error. The program permits you to iterate another 10 times if needed.

Exit : After any of the preceding regionalization techniques are used, the program asks if you want to create a DIRECT requirements or TRANSACTIONS table. If you want to create the transactions table, you must have the total gross outputs for each sector. The program will create a column of final demands and a row of primary payments following the endogenous sectors. Total gross outputs are recorded as the last row and last column of the table. The table is entirely in transaction terms.

SAVE

Purpose : SAVE is the command for storing files onto a disk.
Data may be stored onto any disk or directory.
A variety of data formats may be used.

Syntax : SAVE d:\path\filename.ext

Remarks : d: - Disk drive to write on. This is generally is A:, B:, or C:.
path - This is generally used on a hard disk. The path refers to a subdirectory.
filename- The name of the file you want to save.
ext - Extension. This is the three letters following the period after the file name.

The file name extension (the three letters following the period in a standard file name) denotes the type of file to retrieve. This permits easy transfer of data from a variety of data sources. Data that is retrieved in any of these formats may be SAVED in any of the other formats. The acceptable data formats are:

xxx.DIF - A file that is in the universal data exchange format. Data in this format is interchangeable with TSP, Lotus 123, and other programs.
xxx.PRN - A file that is in the standard ASCII text file format. This is the standard output of Lotus 123 when it prints output to a file.
anything else - A file that is in the special SAM data format. The SAM format conserves disk space. This format is readable by SAM.

After the current matrix is saved, the program asks you:
"Do you want to enter a description with this file?"
If you say yes, the program lists the current description of the file, if the description exists. You are given the option to create a new description. The description can be up to 64 letters long. It is suggested that you include the dimensions of the matrix in the description.

Examples:

SAVE TEST	Store file in the SAM format.
SAVE B:TEST	Store the file on drive B.
SAVE C:\WORK\TEST	Store on the hard drive C and directory \work.
SAVE TEST.DIF	Store a data file in the universal exchange format file.
SAVE TEST.PRN	Retrieve a standard ASCII text format file. This file may be directly imported into a LOTUS 123 worksheet.

Warnings: DO YOU WANT TO REPLACE THE FILE ON DISK?
The file you are saving exists on disk already. If you save the file, the previous file with the same name is erased. If you want to keep both the old file and the new file, then save the current matrix under a different file name on disk.

Errors : DISK IS FULL.
This error occurs if the disk you are saving to does not have enough space to store the current matrix. Place a different diskette in the disk drive (Be sure that it is formatted!) and attempt to save the matrix again.

SUM

Purpose : The SUM option permits you to sum rows or columns and include the totals in the current matrix. The SUM ROWS option will place the new totals as the last row in the matrix. The SUM COLUMNS option will place the totals as the last column in the matrix.

Syntax : SUM [ROWS | COLUMNS | BOTH] range

Remarks : ROWS - Sum the matrix elements across the rows and place the result in a new column at the right side of the matrix.

COLUMNS - Sum the matrix elements down the columns and place the result in a new row on the bottom of the matrix.

BOTH - Sum over both rows and columns.

range - There are two questions asked to identify the rows and columns of a sub-matrix you wish to operate on. These questions are:

1. Enter the beginning and ending rows over which you want columns summed.
2. Enter the beginning and ending columns over which you want rows summed.

Examples: Suppose you have a transactions table with 4 rows and 3 columns. If you want to sum across rows of the first three rows and the last two columns of the table, you would enter:

```
SAM> SUM
Do you wish to sum across ROWS, down COLUMNS, or
BOTH?
SUM   > ROWS
Enter the beginning and ending rows over which you
want the columns summed.
SUM   > 1 2
Enter the beginning and ending columns over which you
want the rows summed.
SUM   > 2 3
```

current matrix

45	54	67
12	32	21
78	84	65
5	2	6

after summation

45	54	67
12	32	21
78	84	65
5	2	6
0	86	88

Errors : YOUR ROW OR COLUMN SELECTION IS GREATER THAN THE NUMBER OF ROWS OR COLUMNS IN YOU CURRENT MATRIX. The matrix already has either 170 rows or 170 columns and there is not enough room for the sum to be stored.

TYPE

Purpose : The TYPE command allows you to write a matrix to the monitor or a ASCII file. The output is can be formatted in a variety of ways.

Syntax : TYPE [YES | NO | FORMAT]

Remarks : YES - Display the entire matrix. This is a response to the question, "Do you want to print the entire matrix?"

NO - Only part of a matrix is to be displayed. The program will then request you to "Enter the beginning and ending rows you want to print" and "Enter the beginning and ending columns you want to print." This forms a sub-matrix to display. If you want to display rows 2 through 5 and columns 1 through 2, you would enter :
TYPE NO 2 5 1 2 .

FORMAT - The FORMAT option permits you to change a variety of display parameters for a more attractive display of the current matrix. The format options are listed below.

COLUMN : Set the number of columns to be displayed on a page. (Default is 5 columns.)

WIDTH : Set the number of characters (digits) to be displayed for each of the columns. All columns have the save width. (Default is 15 digits.)

LENGTH : Set the number of lines per page.

DECIMAL: Set the number of decimal points to be displayed in displaying. This does not limit in any way the precision of the stored numbers. (Default is 5 decimal places.)

HEADER : Allows up to 3 lines of text for the title. To center the title, use the ¦ character as the first character in the header. The title will be centered according to the COLUMN & WIDTH settings. The special variables %n may be used in the headers. (Default header displays the matrix name and the type of input-output table that it is.)

FOOTER : Allows only one line of text as a footer. Centering is also permitted by using the ¦ character in the first character of the footer. (Default is a blank line.)

CLEAR : Returns the HEADERs and FOOTER to the blank. The default title will be set to the name and type of the matrix.

DEFAULT: Returns all FORMAT specifications to the initial settings. These setting are listed after every format option.

STATUS : Lists the format settings.

Examples : Suppose that the current matrix has 20 rows and 10 columns. To display the entire matrix using the default format setting, you would enter:

```
SAM> TYPE YES
```

To display the same matrix but only columns 5 through 9 and rows 8 through the end, you would enter:

```
SAM> TYPE  NO 8 NR 5 9
```

To change the number of columns per page to 10, the column widths to 6 digits, the number of decimal places to 1, a heading of "Nebraska 1986 Direct Requirements Table", and print the entire matrix, you would enter:

```
SAM> TYPE  FORMAT
Enter the format option : Columns, Decimal, Length,
Width, Header, Footer, Setup, Default, Clear, File,
Status or Stop.
TYPE  > COLUMNS
Enter the number of Columns per page. (currently=5)
TYPE  > 10
Enter the format option: ....
TYPE  > WIDTH
Enter the column width. (currently=15)
TYPE  > 6
Enter the format option: ....
```

```
TYPE  > DECIMAL
Enter the number of decimal points to display in
the data. (currently=5)
TYPE  > 1
Enter the format option: ....
TYPE  > HEADER
Enter the Heading for line number you want to
change. (or, stop).
TYPE  > 1
Enter the Heading for line number 1
TYPE  > Nebraska 1986 Direct Requirements Table
Enter the format option: ...
TYPE  > STOP
Do you want to print the entire matrix?
TYPE  > YES
```

This entire conversation with the computer can be entered on a few lines using abbreviations. The program will not prompt you with questions for commands entered on the same line.

```
SAM> TYPE  FORM COL 10 WID 6 HEAD 1
Enter the Heading for line number 1
TYPE  > Nebraska 1986 Direct Requirements Table
Enter the format option: ...
TYPE  > STOP YES
```

Purpose : The " option designed to send a line of text to the printer. This option can only be used in macro programs.

Syntax: " text

Comments: The text following the " option can include any text, numbers, %x variables, or %M values. The %x variables are the the %0, %1, .., %9 global variables. The %M values are any value contained in the current matrix.

Purpose : To permit the listing of any value in the current matrix on the printer.

Syntax : %M,r,c,l,d

where : %M - signifies that in the " option, a value is to be printed,

r - The row number of the element in the matrix.

c - The column number of the element in the matrix.

l - The length of the number of digits, including the decimal point.

d - The number of decimal points.

Example : "The output multiplier is = %M3,2,6,3
The above line in a macro would print the phase 'The output multiplier is = xx.xxx'

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. The includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.