

**THE ECONOMY OF SOUTHWEST COLORADO  
DESCRIPTION AND ANALYSIS**

by

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**May 1984**

**COLORADO WATER RESOURCES**



**RESEARCH INSTITUTE**

**Colorado State University  
Fort Collins, Colorado**

**Technical Report No. 45**

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## CHAPTER 1

### INTRODUCTION

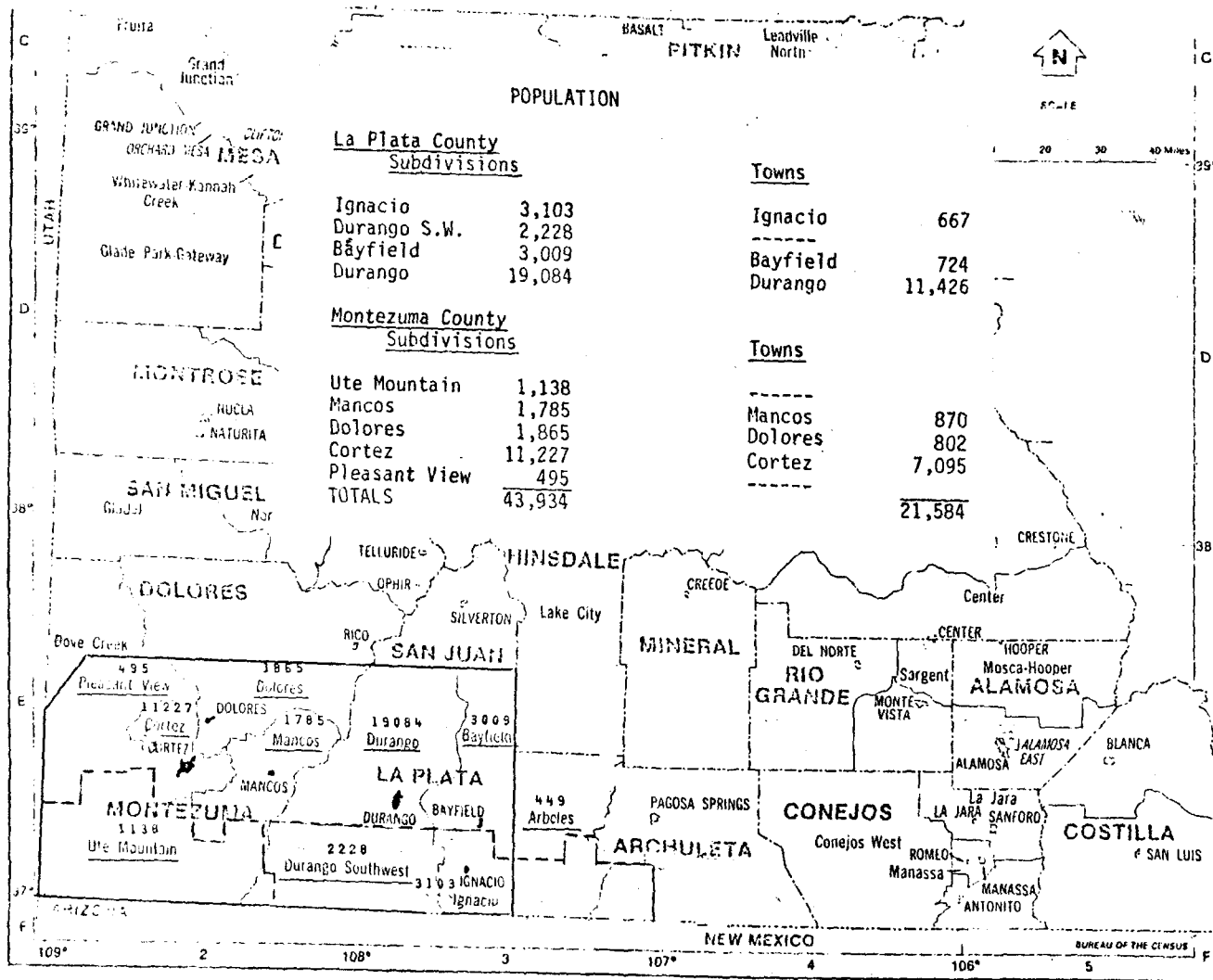
The purpose of this report is to provide a description and analysis of a regional economy within the state of Colorado. The intent of the researchers is to provide policy makers with specific information contributing to the decision-making and planning processes and to provide a planning tool having the capability of analyzing a number of alternative development scenarios in the study region.

### THE REGION UNDER STUDY

The study region consists of two counties in south west Colorado, La Plata and Montezuma counties. The two-county region's 1980 population is estimated at 43,934 inhabitants with an income of some \$250 million. On balance, the region is a net exporter (where exports vs. imports are defined in terms of dollars of sales of goods and services inside or outside the region's boundaries). The major exports are other-retail, utilities (petroleum products delivered by pipeline), livestock, finance/insurance and real estate, gas/auto, eat/drink and lodging. Net exports are estimated at over \$47 million.

### THE MODEL USED

A tool particularly adapted to these questions is the comprehensive interindustry (input-output) production model developed by W. W. Leontief. The strength of this model lies in its capability not only to describe the economic interdependence existing among sectors of economy, but also in the capacity to demonstrate, sector by sector, the



1980 POPULATION BY COUNTY SUBDIVISION



total socio-economic consequences of any number of development scenarios. The input-output model thus is both descriptive and analytical. The descriptive component is accommodated through the collection and tabulation of extensive primary data, from firms and agencies within the region, and subsequent tabulation of the data in the form required by the interindustry framework. The analytical phase consists of the impact analysis, consisting of the use of various multipliers providing consistent forecasts under alternative development scenarios.

#### OUTLINE OF THE REPORT

The remainder of the report consists of an introduction to the input-output method which is presented in Chapter 2 and the analysis of the La Plata-Montezuma County region which is the concern of Chapter 3.

## CHAPTER 2

### SHORT DESCRIPTION OF THE ECONOMIC I-O TECHNIQUE

#### AN INTRODUCTION TO INPUT-OUTPUT ECONOMICS

Economic analysis is used by both public and private decision makers to trace how the market allocates scarce resources into the goods and services that consumers want most. Among the different types of evaluative techniques being employed in the world today, input-output analysis is one of the most important and most powerful. The purpose of this introduction is to describe briefly the nature of the input-output method.

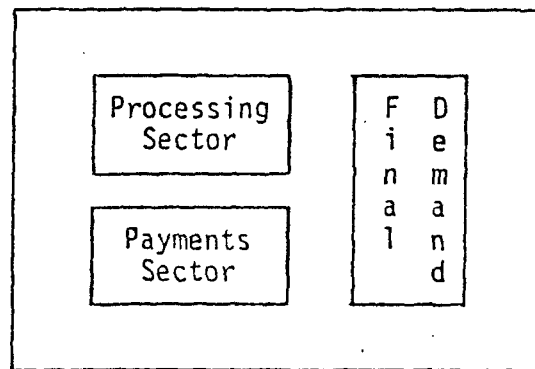
#### THE STRUCTURE OF INPUT-OUTPUT ANALYSIS

An input-output study is essentially a set of double-entry books for an economy — a mapping of interconnections among various lines of business in some particular area. Input-output data are usually organized to show the yearly dollar volume of purchases by each industry from every other industry.

The heart of the input-output system lies in the basic "transactions table" which consists of three major segments — a processing sector, a final demand sector, and a payments sector. The processing sector consists of all firms classified according to several industry lines and includes only transactions among local producers. The payments sector shows amounts paid to taxes, profits, rents and imports. The final demand sector reflects ultimate end use (rather than

intermediate processing): consumption, investment; government purchases, and exports. The sectors defined for the La Plata Montezuma County input-output study are shown in Appendix A.

#### TRANSACTIONS TABLE



#### IS INPUT-OUTPUT NEW?

Conceptually, the input-output technique is not new. A crude forerunner to input-output relations was developed by the French economist Francois Quesnay in 1758. His *Tableau Economique* (economic table) attempted to diagram the flow of money and goods in a nation. Quesnay, a physician, was inspired by Harvey's discovery in 1616 of the human circulatory system to diagram his economic table.

In 1936, Professor Wassily W. Leontief, a Harvard economist, published the results of the first empirical input-output study. This pioneering project, which described the structure of the United States economy for 1919, has been followed by others for the years 1947, 1958, 1968, and 1972. Leontief won the Nobel Prize in Economics in 1973 for his input-output work.

BASIC INPUT-OUTPUT RELATIONS

Business activity in any area — a community, a state, a region, or a nation — is composed of many separate transactions between many distinct producing and distributing enterprises. Since market similarities exist among some firms, it is possible to classify them into industries according to types of business. For example, the sales of all ranch operations might be summed to represent all the firms which fall into that sector. This procedure is necessary because it helps to simplify the number of relationships which have to be made for the analysis. Moreover, because part of the output of one business necessarily becomes an input to other businesses, the connections showing firms buying and selling from one another are recorded as "gross flows" in a transactions-among-sectors table. For example, see Table 2-1 below.

TABLE 2-1. TRANSACTIONS-AMONG-SECTORS  
(Number of Sectors Condensed for Brevity)

	Farm.	Manuf.	Trade	Final Demand	Total
Farming	8	6	6	20	40
Manufacturing	4	2	3	11	20
Trade	4	1	2	23	30
Payments Sector	24	11	19		
TOTAL	40	20	30		90

The categories of suppliers are shown on the left side of the table while purchase categories are listed at the top. Reading across a row traces the dollars of output that each industry sells to other

industries. Reading down a column traces dollars worth of inputs a given industry buys from other businesses.

Consider the processing sector inside the outlined rectangle in Table 2-1. Reading across the first row, farming's total sales (output) are \$40 million. Eight million worth is sold to farmers; \$6 million to trade, and \$6 million to manufacturers. Reading down the first column traces farm purchases (inputs), or how farmers use their total revenue generated from farming operations (the \$40 million) to buy from suppliers and pay them for goods and services. Purchases among farmers are \$8 million; \$4 million go for manufactured goods; \$4 million go for trade, and \$24 million is spent for taxes, rent or is profits. Imports are shown as the final row entry. Each industry, even including labor, can be similarly analyzed.

In addition to the processing sector, input-output tables include an autonomous or "final demand" sector. Final demand is sales for end use. This sector includes non-local government, new investments, and exports. Changes in the amount of final demand "drive" the regional economy. This is because exports are the ultimate sale toward which most business activity is directly or indirectly oriented. Thus an increase of exports stimulates the local economy.

Finally, the "payments sector" is included in an input-output table so that payments to the factors of production for their role in economic activity can be shown: labor is paid wages; capital receives interest; land is paid rent; and entrepreneurship is paid profit. These payments are known as "value added." As you read down the column of input-output Table 2-1 for farming, \$24 million is paid to value added plus imports.

The actual transactions-among-sectors for the study region are shown in Table B-1 in the Appendix. Each column of the table shows the purchases made in 1980 by the industry named at the column head. Sector 4, NEW-COAL, was inserted into the input-output model to simulate what would happen if a new surface mine for coal was developed in the region. Column 4 provides the model with a spending pattern for the new coal sector. Since column 4 shows total spending by the new surface mine of only \$100,000 (one employee) no significant error in the 1980 model has been caused by inserting the hypothetical new coal mine.

However, by including the hypothetical coal sector, we can use the input-output model to measure the employment and income multipliers for coal production.

#### DERIVED TABLES

Table 2-2 is one of "direct requirements" and shows the dollar information of Table 2-1 in percentage terms or as "cents worth of inputs" that each industry needs to produce another dollar's worth of output. The percentage (or ratios) are found by dividing each dollar figure by its column total. To see direct requirements, read down an industry column. Thus, for each dollar of final demand output, farmers buy 20¢ from each other, 10¢ from trade, and 10¢ from manufacturing (or, a total of 40¢ worth from industries inside the economy). Another 60¢ is purchased in the form of wages, interest, rent, taxes, profit and imports. This table is used to project how an industry in an economy will react immediately to changes in final demand.

TABLE 2-2. DIRECT REQUIREMENTS

	Farm.	Manuf.	Trade
Farming	.20	.30	.20
Manufacturing	.10	.10	.10
Trade	.10	.05	.07
Payments Sector	.60	.55	.63
TOTAL REQUIREMENT	1.00	1.00	1.00

The direct requirements for the La Plata-Montezuma County region are shown in Appendix Table B-2. Each column of the table shows the percentage distribution of spending for inputs by the industry named at the column head.

The immediate impacts computed in the direct requirements table are followed by even longer-term effects which can be found by calculating "total requirements." Successive rounds of production and demand arise because suppliers need local inputs to make and sell their outputs. For example, from Table 2-2, if farmers increase output by \$1, they must buy 10¢ worth of inputs from trade. In turn, trade must buy inputs from other industries, and so on. In this way, many direct requirements reciprocate through an economy. "Total requirements" are calculated by using a high-speed computer to determine the cumulative influences of each industry group on the other, as shown in Table 2-3.

TABLE 2-3. TOTAL REQUIREMENTS

	Farm.	Manuf.	Trade
Farming	1.34	.47	.34
Manufacturing	.17	1.17	.16
Trade	.15	.11	1.11
Multiplier:	1.66	1.75	1.61

"Total requirements" are interpreted as follows: As farming increases its output by \$1 to satisfy final demand, sales among farms rise to \$1.34, manufacturers ultimately will supply 17¢ worth of inputs (and trade will supply 15¢ worth). These figures are greater than corresponding "direct requirements" because industries depend on one another. Indeed, finding the quantitative nature and extent of this "interdependence" is the real purpose of input-output analysis. The total requirements table is a matrix inverse which results as a solution to the set of simultaneous equations which describe the dollar flows shown in Table 2-1.

A closely related task in input-output is to calculate "multipliers" which specify the cumulative effects that an increase in final demand has on all industries combined. Multipliers are found by adding the values of "total requirements" in each column (as in the bottom row of Table 2-3). Multipliers are greatest in industries having the most output-creating power inside an economy. In Table 2-3, the value of the Manufacturing Multiplier is 1.75; thus, every \$1 of Manufacturing output for final demand ultimately generates \$1.75 worth of goods in the study region. As this additional output is created, income and



employment will also rise (which will bolster the processing sector economy).

The cumulative effects (multiplier effects) of spending in La Plata-Montezuma County region are shown in Table B-3 in the Appendix. Each number in the table shows what happens to sales for the industry named for that row when the industry named for that column expands exports by \$1. For example, the number in the Household Row (row 25) and the NEW-COAL Column (column 4) shows that for every \$1 of coal exports, 33.10 cents will directly and indirectly be spent in the region on wages and salaries for workers.

#### WHERE ARE INPUT-OUTPUT DATA OBTAINED?

In order to be able to construct a transactions table, and compute the direct and total requirements table, the input-output economist must obtain detailed income and outlay distributions from businesses, governments, and consumers. This task involves many hours of research, sometimes via mail questionnaires, but mainly through personal interviews, and by gleaning figures from government documents, business reports, and even newspapers. Not only must the raw data be collected, but a system of cross-checking and verification must be established to make sure figures used are valid and reliable. The structure of the input-output model whereby sales by sector must equal purchases provides a final consistency check on industry totals. The methodology and data sources for the La Plata-Montezuma County input-output study are described in Appendix C.

Sector-by-sector data sources for the input-output model are discussed briefly here. The agricultural sectors were estimated from

secondary data sources available at Colorado State University, these include farm management services extension records, state and federal publications. The extraction sectors were estimated from personal interview survey. The hypothetical new coal sector is based upon prior surface coal surveys in northwestern Colorado. The construction sector, the manufacturing sectors and the trade sectors are based upon personal interview surveys. Public health, education, local, state and federal government are based upon secondary sources.

## CHAPTER 3

### ECONOMIC ANALYSIS OF LA PLATA-MONTEZUMA COUNTY REGION

#### INTRODUCTION

The results of the descriptive analysis of the study region's economy are presented in this chapter. The discussion contained in the chapter includes: the description of the economy; an analysis of the nature and magnitude of economic interdependence among processing sectors; the various business activity and income multipliers; and an analysis of employment in the region by industry and by occupation.

The description and analysis of the economy hinges on three major components of the interindustry model. These are: the gross flows or transactions table; the table of direct production requirements; and the table of direct plus indirect production requirements. These tables are discussed and interpreted in turn. Because of the size of the tables, they are presented in the Appendix.

#### THE TRANSACTIONS-AMONG-SECTORS TABLE

The first essential component of any interindustry study is the collection and tabulation of data which serve to describe the flows of commodities from each supplying sector to each purchasing sector. These flows are typically expressed in terms of the dollar value of transactions occurring in a specific period of time, normally one year. The information is arrayed in tabular form with the suppliers (selling sectors) listed at the left of the table and the purchasing sectors listed at the top. The information in this table, termed the

transactions-among-sectors table, does two things simultaneously: it identifies the estimated dollar value of sales by each sector to each of the other sectors (thus, the distribution of each sector's output), and it identifies the purchases of ingredients of production by each sector from each of the other sectors (the distribution of purchases). In essence, the material contained in the transactions table represents a double-entry system of bookkeeping in which every sale is simultaneously described as a purchase. The transactions-among sectors table for La Plata-Montezuma County region is found in Appendix B. A description of the sector identification labels used throughout the Appendix and in the tables of this chapter is shown in Appendix A.

The rows and columns of Appendix Table B-1 which are numbered 1-24 and row and column 26, identify the processing, or intermediate demand, sectors. Row and column 25 represent subtotals of activities (excluding households) within the processing sector. This portion of the table describes, in dollar terms, the flow of goods and services necessary to satisfy intermediate demands. Final demands, i.e., demands for goods and services that will not be further processed within the region, are identified in columns 27-31. Rows 27-32 identify the final payments sector. Final payments include, federal and state taxes, wages, profits, rents, losses, net inventory depletions, and payments for goods and services imported from outside the region. The row and column numbered 30 (the transfer account) is an accounting device as described previously. The last row and column of Table B-1 contain, respectively, total outlay (purchases) and total output (sales) for each sector of the regional economy.

The distribution of total output of each sector, according to the sectors in which the output is sold, may be readily discerned by reading across the rows of Table B-1. The bill of purchases by each sector is found by reading down any column of the table. These column entries show the allocation of purchases by cost component.

For example, consider sector 1, Livestock. Reading across row 1 of Table B-1 shows that the total output of Livestock was distributed in the following way: \$1,650,516 worth of output was sold within the Livestock sector; \$1,743,750 was sold to Processors; and \$33,184,592 was exported. The total gross output of the Livestock sector is the sum of these individual sales or \$41,700,993.

The distribution of purchases by Livestock by cost category is shown in column 1 of Table B-1. Purchases by Livestock from Livestock were estimated at \$1,650,516; from Other-Agr. \$4,948,763; from Transport \$570,220; and so on down the column. Total purchases by the Livestock sector thus amount to \$41,700,993 and, as required by the accounting format, equal the value of output.

Other information can be obtained directly from the transactions table. The household row, with the exception of the sale by households to the transfer account represents wages paid subject to withholding. This row shows household income by industry source.

While these items, obtained directly from the transactions table, are useful as initial indicators of the relative importance of each sector in the regional economy, the important question of interdependence is not addressed. In order to do so, it is first necessary to isolate the direct production relationships existing in the economy.

DIRECT PRODUCTION REQUIREMENTS

The direct production requirements, or coefficients, represent the second major component of the interindustry analysis. These direct requirements are presented in Appendix Table B-2. Computation of the direct production requirements is quite simple, given the transactions table, and requires only that each column entry of the transactions table be divided by the respective column total. The resulting coefficients describe the direct purchases necessary from each supplier (at the left of the table) in order for the purchasing sector (at the head of the column) to produce one dollar's worth of output. The coefficients, then, are interpreted as the direct requirements per dollar of output produced by each sector.

As an example consider the Livestock sector, sector 1 (column 1 of the direct requirements table). For every dollar's worth of output produced by Livestock in the region, \$.039 worth of inputs are required from the Livestock sector, \$.118 from Other-Agr., \$.013 from Transport, \$.001 from Communicat and so on down the column. It is obvious from the table that the largest direct purchases made by the Livestock sector are those for finance, with a direct outlay of over 30 cents per each dollar of output produced. This says that a dollar's worth of livestock production requires an input of financial services valued at 30 cents. Each column of the direct requirements table is interpreted in this manner.

These direct impacts identify only a portion of the total economic impacts that would accompany a change in final demands for the output of a given sector. There are additional, or indirect, impacts which can be quite important. Assessment of all direct and indirect impacts

of these exogenous (final demand) changes is made possible through the third analytical component of interindustry analysis. This component is the table of direct plus indirect production requirements.

#### DIRECT PLUS INDIRECT IMPACTS

The concept of interdependence can be established with a brief example. Suppose that the export demand for cattle production increases. There will be immediate, or direct, responses of the following type: Other-Agr. production will have to increase. In order for Other-Agr. production to increase, local inputs must be obtained from sectors such as wholesale, finance, and labor. These are indirect impacts. As labor, wholesale, and finance increase their output to meet the increasing requirements in the Other-Agr. sector, their own requirements for productive ingredients increase. The chain of events goes on. The total impacts are readily estimated through the input-output framework and are presented in Appendix Table B-3.

The direct plus indirect coefficients are interpreted as the production required or generated in all sectors of the economy in order to sustain the delivery of one dollar's worth of output to final demand by any single sector. It should be carefully noted that these coefficients reflect production generated per dollar of final demand as opposed to requirements per dollar of output. This, of course, reflects the fact that the model is driven by changes in final demand (exports).

For purposes of interpretation, consider the Livestock sector. Suppose that the export sales for Livestock increase by \$1 million. What is the estimated impact that this increase will have on the entire

La Plata-Montezuma County area? The answer to this question may be obtained directly by reading down column 1 of the Direct and Indirect Requirements table and summing the individual sector impacts. Thus, the increase of \$1 million in the final demand for Livestock generates a direct plus indirect production valued at \$1,042,200 in Livestock ( $\$1 \text{ million} \times 1.0422$ ); \$129,400 in the Other-Agr. sector; \$18,000 in O/G-Mines and so on down the column. Any column of this table is interpreted in this same manner. The sum of the entries in column 1 show the total production generated locally as a result of the increase in export demands for Livestock. The total business activity generated per dollar increase in final demand for Livestock is \$2.8143 or, in our example assuming a \$1 million increase, \$2.81 million worth of business activity results. These column sums are one of the various multiplier concepts which are derived from input-output analysis.

#### BUSINESS MULTIPLIERS

The column sums of the direct plus indirect requirements table are termed business activity (or production) multipliers. They identify the total value of production in the region which results from a dollar's worth of output delivered to final demand. Table 3-1 presents the business multipliers. These estimates indicate that the greatest business activity generated per dollar of private sector exports is the log-mills sector. The business multiplier for this sector is 3.09 which indicates that, as the "final demand" for log-mills increases by \$1, a total production of \$3.09 is generated in the region's economy. Other sectors of the economy which have relatively large business multipliers are: livestock (2.8), educat-serv (2.7), health-serv (2.5),



TABLE 3-1. LA PLATA-MONTEZUMA COUNTY  
BUSINESS ACTIVITY MULTIPLIERS, 1980

(In dollars of business activity  
generated in the trade area per  
dollar delivered to final demand.)

	<u>Sector</u>	<u>Business Multiplier</u>
1	LIVESTOCK	2.814
2	OTHER-AGR	1.986
3	O/G-MINES	1.567
4	NEW-COAL	1.888
5	CONSTRUCT	2.204
6	PROCESSORS	1.879
7	LOG-MILLS	3.093
8	PRINT/PUB	2.185
9	OTHER-MFG	2.187
10	TRANSPORT	2.179
11	COMMUNICAT	1.552
12	UTILITIES	1.949
13	WAT/SEW/TR	2.258
14	WHOLESALE	1.212
15	GAS/AUTO	1.654
16	EAT/DRINK	1.772
17	OTHER-RET	1.631
18	F/I/R/E	1.536
19	LODGING	2.241
20	HEALTH-SER	2.559
21	EDUCAT-SER	2.732
22	OTHER-SER	2.271
23	LOC-ROADS	2.920
24	LOC-GOVT	3.382
25	HOUSEHOLDS	2.470

and lodging (2.2). These sectors show the greatest degree of interdependence with other sectors of the regional economy. At the margin, these sectors generate the greatest business activity per dollar of output delivered to final demand. The phrase, "at the margin," is important as a qualification in the use of these multipliers. It implies a word of caution concerning the implications of the multipliers. In using the business multipliers, the argument should be stated in terms of the impacts of an equal dollar increase in exports. That is, for an equal increase (in dollar terms) in final demands, local government will generate more business activity in the local economy than will any other sector. However, a large exogenous change in local government exports is highly unlikely.

#### INCOME MULTIPLIERS

Other multiplier effects can also be estimated from the inter-industry model. For example, there are income multipliers which are calibrated in terms of changes in income paid to the household sector. The following discussion presents what are termed the Type I and Type II income multipliers.

The Type I and Type II income multipliers are estimated ratios: Type I is the ratio of the direct plus indirect income to the direct income paid households; Type II is the ratio of direct plus indirect plus induced income to direct income. Thus, while the business activity multipliers are related to changes in sales to exports, the income multipliers are related to changes in income paid to the household sector. The Type I multiplier describes the direct plus indirect income increases emanating from an additional dollar of direct income

TABLE 3-2. LA PLATA-MONTEZUMA COUNTY  
INCOME MULTIPLIERS, 1980

(In dollars of income generated per dollar  
of direct income paid to households.)

Sector	Income Multipliers	
	Type I	Type II
1 LIVESTOCK	3.260	3.944
2 OTHER-AGR	2.162	2.615
3 O/G-MINES	1.223	1.479
4 NEW-COAL	1.229	1.487
5 CONSTRUCT	1.396	1.688
6 PROCESSORS	1.215	1.469
7 LOG-MILLS	1.856	2.244
8 PRINT/PUB	1.141	1.380
9 OTHER-MFG	1.109	1.342
10 TRANSPORT	1.089	1.317
11 COMMUNICAT	1.183	1.431
12 UTILITIES	2.478	2.997
13 WAT/SEW/TR	1.415	1.712
14 WHOLESALE	1.132	1.369
15 GAS/AUTO	1.315	1.590
16 EAT/DRINK	1.198	1.449
17 OTHER-RET	1.278	1.546
18 F/I/R/E	1.350	1.633
19 LODGING	1.091	1.320
20 HEALTH SER	1.072	1.297
21 EDUCAT SER	1.059	1.281
22 OTHER SER	1.102	1.333
23 LOC ROADS	1.287	1.556
24 LOC GOVT	2.292	2.772

A note on the Application of Income Multipliers. If data on increased exports of an industry are known, then the proper approach is to apply the business multiplier for that industry to exports. If, however, only the added payroll for the industry expansion is known, then the income multipliers can be applied to that payroll expansion to find the direct plus indirect increase in payroll due to the industry expansion.

paid to households. The Type II multiplier takes into account not only the direct plus indirect changes in income, but also the induced income increases generated by additional consumer spending. Accordingly, the Type II income multiplier identifies the direct plus indirect plus induced income generated by an additional dollar of income paid directly to households.

Attention is drawn to the comparatively high income multiplier value estimates for the agricultural sectors. The La Plata-Montezuma input-output study allocated proprietorship and partnership net incomes to the profit account. As a result, labor inputs (household account) for agriculture and livestock, are somewhat understated because this sector is characterized by a relatively high incidence of proprietorship and partnership enterprises with relatively little hired help. By understating the value (contribution) of labor inputs for this sector, the value (contribution) of other inputs, relative to labor, became larger. And, with direct income being the denominator of the Type I and Type II income multiplier ratios, the multiplier estimate for this sector is of the relatively high magnitude observed. By contrast the relatively high multiplier value for sectors such as utilities and local government exists because these sectors exhibit greater interdependence in the local trade area.

#### EMPLOYMENT ANALYSIS

Direct employment requirements as is the case with direct business activity and direct income payments are, by themselves, of limited use for assessing the impacts of various changes in economic activity in the La Plata-Montezuma County region. This limitation arises because

direct requirements differ from total requirements, the difference being indirect requirements that emanate from sectoral interdependence. The interindustry model provides a framework within which both direct and indirect employment requirements can be addressed. Basic to the analysis are data on employment levels in the respective sectors and the table of direct plus indirect requirements per dollar of output delivered to final demand. The estimated employment levels and corresponding employment coefficients (expressed as the number of employees per dollar of total gross output) used in the analysis are presented in Table 3-3.

To assess the total employment impacts of exogenous changes in final demand, the table of direct and indirect requirements per dollar of delivery to final demand was pre-multiplied by a diagonal matrix of direct labor use requirements (where the elements of the diagonal are the employment coefficients shown in Table 3-3). Summing down the respective columns of the resulting matrix yielded the estimates of the direct and indirect labor requirements per dollar delivered to final demand. Table 3-4 presents the estimates.

The interpretation of the entries in Table 3-4 is demonstrated by an example from the Livestock sector. As the final demand for the output of Livestock expands by \$1, there will be a direct expansion of employment in that sector as well as those sectors responsible for supplying production ingredients to the Livestock sector. The sectors supplying ingredients to the Livestock sector will in turn require production ingredients from others and this will further expand indirect employment impacts; and so forth. The magnitude of the direct and indirect employment impacts, 37.2, shows the total employment generated

TABLE 3-3. LA PLATA-MONTEZUMA COUNTY  
EMPLOYMENT AND EMPLOYMENT  
COEFFICIENTS BY SECTOR, 1980

	<u>Total Employment</u>	<u>Workers per \$ Total Output</u>
1 LIVESTOCK	459	.00001100
2 OTHER-AGR	851	.00006204
3 O/G-MINES	274	.00000630
4 NEW-COAL	1	.00001000
5 CONSTRUCT	1219	.00001190
6 PROCESSORS	166	.00001155
7 LOG-MILLS	251	.00003123
8 PRINT/PUB	144	.00003677
9 OTHER-MFG	278	.00004519
10 TRANSPORT	359	.00002289
11 COMMUNICAT	200	.00000770
12 UTILITIES	224	.000002564
13 WAT/SEW/TR	81	.000026750
14 WHOLESALE	461	.000006708
15 GAS/AUTO	359	.000006416
16 EAT/DRINK	1243	.000039090
17 OTHER-RET	1594	.000010550
18 F/I/R/E	582	.000007602
19 LODGING	1114	.000055590
20 HEALTH-SER	1069	.000039070
21 EDUCAT-SER	1524	.000045320
22 OTHER-SER	1246	.000040370
23 LOC-ROADS	207	.000056030
24 LOC-GOVT	910	.000035150
25 HOUSEHOLDS	99	.000000396
26 STATE-GOVT	334	.000015070
27 FED-GOVT	361	.000003566

TABLE 3-4. LA PLATA-MONTEZUMA COUNTY  
 DIRECT PLUS INDIRECT LABOR REQUIREMENTS PER  
 MILLION DOLLARS DELIVERED TO FINAL DEMAND BY SECTOR, 1980

	<u>Direct + Indirect Labor Requirement Per Million \$ of Final Demand</u>
1 LIVESTOCK	37.2
2 OTHER-AGR	75.4
3 O/G-MINES	12.6
4 NEW-COAL	20.0
5 CONSTRUCT	24.4
6 PROCESSORS	20.6
7 LOG-MILLS	58.9
8 PRINT/PUB	48.7
9 OTHER-MFG	55.9
10 TRANSPORT	34.4
11 COMMUNICAT	13.9
12 UTILITIES	10.5
13 WAT/SEW/TR	41.6
14 WHOLESALE	8.8
15 GAS/AUTO	11.6
16 EAT/DRINK	46.0
17 OTHER-RET	16.1
18 F/I/R/E	12.9
19 LODGING	66.7
20 HEALTH-SER	53.2
21 EDUCAT-SER	59.8
22 OTHER-SER	51.9
23 LOC-ROADS	75.3
24 LOC-GOVT	76.6
25 HOUSEHOLDS	18.9

in the entire economy as this single sector, Livestock, increases by \$1 million, its deliveries to final demand. That is to say that an increase of \$1 million in the final demands, e.g., exports, for Livestock would result in an estimated additional employment of 37.2 persons in the La Plata-Montezuma County region. All remaining entries in Table 3-4 have analogous interpretations for their respective sectors. The leading sectors in terms of direct and indirect employment generation in the economy are other-agr., lodging, educational services, other-mfg, log-mills, printing-publishing and eat-drink.

#### OCCUPATION ANALYSIS

The direct and indirect occupational requirements are derived in much the same manner as were the employment multipliers discussed in the previous section. To estimate the total occupational impacts of exogenous changes in final demand, the table of direct and indirect requirements per dollar of delivery to final demand was pre-multiplied by a diagonal matrix of direct requirements for each employment occupation. Direct requirements for seven categories of employment occupation were calculated from data published by Colorado Division of Employment and Training (see Table 3-5). Thus, seven occupational requirements matrices were created.

Summing down the columns of the seven occupational requirements tables yields the industry multipliers for the seven occupations as shown on Table 3-6. The total multiplier column in Table 3-6 is identical with the employment multipliers shown in Table 3-4 (except for rounding error) since the total requirements for all occupations for any given sector must equal the employment multiplier for that sector.



TABLE 3-5. DISTRIBUTION OF EMPLOYMENT BY OCCUPATION IN WESTERN COLORADO

<u>Occupation</u>	<u>Mining</u>	<u>Construction</u>	<u>Manufacturing</u>	<u>T/C/PU*</u>	<u>Trade</u>	<u>F/I/RE**</u>	<u>Services</u>	<u>Government</u>
Managers	.065005	.130768	.095024	.111481	.108001	.219141	.075080	.155926
Professional	.127625	.026865	.043674	.106958	.021260	.053922	.314389	.152641
Technical	.034464	.002552	.018661	.039377	.001466	.003333	.046741	.038918
Service	.011847	.005709	.012176	.014101	.357046	.088918	.284006	.201036
Maint.-Prod.	.665436	.734166	.683563	.495144	.174713	.066540	.096560	.222012
Clerical	.093238	.088320	.106803	.207929	.154710	.474110	.171595	.229467
Sales	.002385	.011619	.040100	.025010	.182804	.094036	.011630	0
Total	1.000000	.999999	1.000001	1.000000	1.000000	1.000000	1.000001	1.000000

Source: Calculated from estimated 1983 employment by occupation, as reported in, Occupational Employment Outlook 1983-1988, Western Vocational Planning Region, Colorado Division of Employment and Training, March 1983, p. 131.

\*T/C/PU — Transportation, Communications, and Public Utilities.

\*\*F/I/RE — Finance, Insurance, and Real Estate.

TABLE 3-6. LA PLATA-MONTEZUMA COUNTY DIRECT AND INDIRECT LABOR REQUIREMENTS  
PER MILLION DOLLARS DELIVERED TO FINAL DEMAND BY SECTOR AND BY OCCUPATION, 1980

<u>Sector</u>	<u>1-Mgrs.</u>	<u>2-Prof.</u>	<u>3-Tech.</u>	<u>4-Service</u>	<u>5-Maint./Prod.</u>	<u>6-Clerical</u>	<u>7-Sales</u>	<u>Total</u>
1 LIVESTOCK	2.74	2.64	0.45	5.07	19.59	4.91	1.80	37.20
2 OTHER-AGR	4.48	5.39	0.94	8.42	45.82	7.95	2.39	75.39
3 O/G-MINES	1.13	1.79	0.40	1.51	5.60	1.78	0.33	12.54
4 NEW-COAL	1.80	2.80	0.64	2.27	9.13	2.83	0.51	19.47
5 CONSTRUCT	2.92	2.04	0.31	2.67	12.38	3.12	0.87	24.31
6 PROCESSORS	1.88	1.41	0.38	1.71	10.87	2.59	0.96	19.80
7 LOG-MILLS	5.90	4.23	1.25	3.86	33.25	7.70	2.65	58.84
8 PRINT/PUB	4.75	3.67	1.04	3.27	27.54	6.19	2.16	48.62
9 OTHER-MFG	5.46	3.46	1.11	2.97	33.48	6.81	2.56	55.85
10 TRANSPORT	3.80	4.24	1.23	3.02	13.94	6.88	1.27	34.38
11 COMMUNICAT	1.57	1.84	0.50	1.56	5.10	2.29	0.49	13.35
12 UTILITIES	1.07	1.42	0.35	1.24	4.31	1.78	0.33	10.50
13 WATER/SEW/TR	4.75	5.04	1.49	3.15	17.07	8.67	1.42	41.59
14 WHOLESALE	0.94	0.42	0.06	2.85	1.62	1.40	1.36	8.65
15 GAS/AUTO	1.26	0.62	0.09	3.74	2.15	1.90	1.76	11.52
16 EAT/DRINK	4.96	1.80	0.23	15.64	8.39	7.31	7.68	46.01
17 OTHER-RET	1.73	0.81	0.12	5.06	3.27	2.59	2.43	16.01
18 F/I/R/E	2.34	1.20	0.16	1.77	1.49	4.89	1.06	12.91
19 LODGING	5.39	19.16	2.91	18.38	7.84	11.61	1.34	66.63
20 HEALTH-SER	4.42	14.56	2.22	14.60	6.64	9.30	1.38	53.12
21 EDUCAT-SER	4.97	16.48	2.51	16.42	7.35	10.52	1.53	59.78
22 OTHER-SER	4.32	14.27	2.17	14.16	6.57	9.09	1.30	51.88
23 LOC-ROADS	10.90	11.23	2.64	15.72	17.21	16.26	1.23	75.19
24 LOC-GOVT	9.67	14.58	2.91	17.51	14.77	15.76	1.35	76.55
25 UTE-HH	1.66	1.66	0.28	3.41	3.00	2.93	1.32	14.26
26 HOUSEHOLDS	2.06	2.72	0.48	4.80	3.90	3.48	1.42	18.86

Table 3-6 is interpreted as follows; using sector 4 as an example, increasing coal production by \$1 million results in the requirement for 1.8 managers, 2.8 professionals, 0.64 technicians, 2.27 service workers, 9.13 maintenance-production workers, 2.83 clerical workers, and 0.51 sales persons. A total of 19.47 workers are required directly and indirectly due to the \$1 million of increased coal exports. A detailed description of the seven occupations is shown in Appendix D.

## APPENDICES

### Appendix

- A. Sector Definition, La Plata-Montezuma County I-O Model
  - A-1. Sector Description, La Plata-Montezuma County I-O Model
  - A-2. SIC Sector Identification, La Plata-Montezuma County I-O Model
- B. Input-Output Tables for the La Plata-Montezuma County Region
  - B-1. Transactions-Among-Sectors, 1980
  - B-2. Direct Requirements Per Dollar of Output, 1980
  - B-3. Direct and Indirect Requirements Per Dollar of Output Delivered to Final Demand, 1980
- C. Methodology and Data Sources
- D. Identification of Occupations
- E. Bibliography

## APPENDIX A-1

## SECTOR DESCRIPTION, LA PLATA-MONTEZUMA COUNTY I-O MODEL

Sector	Sector Description
1 LIVESTOCK	Cattle and Sheep Ranching
2 OTHER-AGR	Dryland and Irrigated Crops, Forestry Management, Landscape Design
3 O/G MINES	Producers of Crude Oil, Natural Gas and Mining
4 NEW-COAL	Hypothetical sector to calibrate the I-O model for the expansion of a modern surface coal mine
5 CONSTRUCT	Sand and Gravel, Ready-Mix Concrete, Special Trade Contractors, e.g., Plumbers, Electricians, Carpenters, Heating Installers, etc.
6 PROCESSORS	Food Processing and Bottlers of Food and Drink
7 LOG-MILLS	Logging, Sawmills and Finishing Mills
8 PRINT/PUB	Newspapers, Custom Printers and Photocopy Services
9 OTHER-MFG	Metal Fabricators, Welding, Clothing, Mfg. of Pottery, Jewelry, etc.
10 TRANSPORT	Trucking, Bus Service, Airlines, Post Office Services
11 COMMUNICAT	Telephone, Radio Stations, Television Stations
12 UTILITIES	Electric and Natural Gas Distribution and Pipelines
13 WAT/SEW/TR	Water Service, Sewer Service and Trash Collection
14 WHOLESALE	Firms that sell primarily to Retail Establishments
15 GAS/AUTO	Gas Stations, Auto Dealers and Auto Repair Establishments
16 EAT/DRINK	Restaurants and Drinking Places
17 OTHER-RET	Hardware and Lumber Stores, Variety Stores, Appliance and Furniture Stores, Catalog, Groceries, Liquor, Clothing, Gift and Souvenir Shops, etc.
18 F/I/R/E	Commercial Banks, Savings and Loan, Other Banks, Insurance Agencies, Real Estate and Title Insurance Offices, Property Developers
19 LODGING	Motels, Hotels, Inns and Campgrounds
20 HEALTH-SER	Doctors, Hospitals, Nursing Homes, Retirement Homes
21 EDUCAT-SER	Public and Private Schools
22 OTHER-SER	Leasing, Accountants, Lawyers, Engineers, Computer and Business Services, Laundry, Movie Theatres, Entertainment Services, Clubs, Churches, Photography Studios
23 LOC-ROADS	City and County Road Maintenance
24 LOC-GOVT	Other City and County Government
25 HOUSEHOLDS	Other Households
26 STATE-GOVT	State Government
27 FED-GOVT	Federal Government
28 PROF-DEPR	Profit, Rent, Depreciation, Business Saving
29 TRANSFERS	Social Security Payments, Retirement Income and other income Transfers
30 IMP-COLO	Purchases by residents and firms made outside the Trade Area and inside Colorado
31 IMP-WORLD	Purchases by residents and firms made outside the Trade Area and outside Colorado.

## APPENDIX A-2

## SIC SECTOR IDENTIFICATION, LA-PLATA MONTEZUMA COUNTY I-O MODEL

<u>Sector</u>	<u>SIC Codes*</u>
1-2	010-029 and 071-097
3	101-149
4	(surface coal mining only)
5	152-179
6	201-209
7	241-249
8	271-279
9	221-239 and 251-266 and 281-399
10	411-478
11	481-489
12	491-493
13	494-497
14	501-519
15	551 and 554 and 753
16	581
17	521-549 and 552 and 553 and 555-557 and 559 and 561-573 and 591-599
18	601-679
19	701-704
20	801-809
21	821-829
22	721-752 and 754-769 and 781-799 and 811 and 832-842 and 861-869 and 891-899
23-24	local government

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\*Standard Industrial Classification Manual, 1972, Statistical Policy Division, Office of Management and Budgets, U.S. Govt. Printing Office.

APPENDIX B-1

TRANSACTIONS AMONG SECTORS (purchases by sectors shown at top from sectors shown at left...last rows are resource inputs)

		DOLLARS									
		1	2	3	4	5	6	7	8	9	10
		LIVESTOCK	OTHER-AGR	O/G-MINES	NEW-COAL	CONSTRUCT	PROCESSORS	LOG-MILLS	PRINT/PUB	OTHER-MFG	TRANSPORT
1	LIVESTOCK	1650516.	0.	0.	8.	0.	1743750.	0.	0.	0.	0.
2	OTHER-AGR	4958763.	506593.	0.	0.	0.	0.	0.	0.	0.	0.
3	O/G-MINES	0.	0.	856380.	0.	0.	0.	0.	0.	34408.	0.
4	NEW-COAL	0.	0.	0.	105.	0.	0.	0.	0.	0.	0.
5	CONSTRUCT	0.	50289.	226835.	577.	16944212.	36000.	806400.	8557.	7491.	9600.
6	PROCESSORS	0.	0.	0.	0.	5517.	0.	0.	0.	0.	0.
7	LOG-MILLS	0.	0.	4000.	0.	0.	0.	1701120.	0.	23010.	501.
8	PRINT/PUB	0.	692.	6715.	5.	17241.	12781.	38400.	4317.	11754.	11898.
9	OTHER-MFG	0.	86491.	17000.	1095.	191688.	0.	23040.	5358.	58463.	172779.
10	TRANSPORT	570220.	67763.	280549.	1910.	416842.	92675.	998400.	75379.	61325.	198747.
11	COMMUNICAT	61615.	7695.	62988.	84.	276428.	72890.	35520.	26873.	61325.	53689.
12	UTILITIES	37766.	97315.	127789.	2711.	166762.	75513.	408960.	65177.	112663.	30273.
13	WAT/SEW/TR	226600.	100507.	16357.	36.	53569.	26656.	3840.	10314.	25412.	1437.
14	WHOLESALE	912344.	2359981.	700860.	1319.	4408260.	150846.	253440.	4318.	478484.	44893.
15	GAS/AUTO	3582235.	204828.	229306.	340.	920534.	8500.	51840.	32306.	44213.	49887.
16	EAT/DRINK	0.	345.	35702.	49.	55402.	9281.	11520.	4638.	1522.	3276.
17	OTHER-RET	10763734.	295816.	50965.	140.	4365586.	18482.	230400.	2356.	18879.	122938.
18	F/I/R/E	12548513.	1845826.	189063.	792.	2061324.	179046.	180480.	163214.	186473.	103755.
19	LODGING	0.	259.	8317.	0.	5966.	0.	18240.	0.	7795.	0.
20	HEALTH-SER	0.	345.	350.	50.	1738.	3712.	46080.	0.	0.	752.
21	EDUCAT-SER	0.	86.	376.	9.	0.	0.	0.	0.	731.	251.
22	OTHER-SER	1230021.	425728.	72463.	93.	4460457.	24375.	88320.	242694.	84467.	358183.
23	LOC-ROADS	0.	0.	0.	0.	0.	0.	14400.	0.	0.	0.
24	LOC-GOVT	1616875.	510051.	1393389.	4800.	320795.	39344.	34560.	10508.	33616.	304086.
25	subtotals	38159202.	6560610.	4279404.	14123.	34672321.	2493851.	4944960.	656009.	1252031.	1466945.
26	HOUSEHOLDS	2878273.	985550.	6155552.	22258.	22374843.	2583019.	2035276.	1351112.	2107648.	6134213.
27	STATE-GOVT	11553.	138488.	1007459.	8483.	1151035.	133527.	133766.	15352.	62608.	340305.
28	FED-GOVT	651965.	726952.	8619425.	6949.	3125672.	468214.	249298.	90354.	243885.	783292.
29	PROF-DEPR	0.	4832121.	14555398.	15137.	8082327.	815519.	657984.	268857.	385862.	2059674.
30	TRANSFERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	56156.
31	IMP colo	0.	411170.	1102184.	11833.	17267971.	5407277.	15047.	77613.	1080604.	4189267.
32	IMP wrld	0.	62792.	7769136.	21217.	15788810.	2472771.	0.	1456970.	1019648.	654479.
33	totals	41700993.	13717683.	43488558.	100000.	102462979.	14374178.	8036331.	3916267.	6152286.	15684331.

1 EMPLOYMENT 0.4587E 03 0.8510E 03 0.2740E 03 0.1000E 01 0.1219E 04 0.1660E 03 0.2510E 03 0.1440E 03 0.2780E 03 0.3590E 03

APPENDIX B-1

TRANSACTIONS AMONG SECTORS (purchases by sectors shown at top from sectors shown at left...last rows are resource inputs)

		DOLLARS									
		11	12	13	14	15	16	17	18	19	20
		COMMUNICAT	UTILITIES	WAT/SEW/TR	WHOLESALE	GAS/AUTO	EAT/DRINK	OTHER-RET	F/I/R/E	LODGING	HEALTH-SER
1	LIVESTOCK	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2	OTHER-AGR	0.	0.	0.	162676.	0.	0.	46820.	0.	0.	0.
3	O/G-MINES	0.	35102093.	0.	0.	0.	0.	0.	0.	0.	0.
4	NEW-COAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5	CONSTRUCT	906.	1111831.	101239.	124146.	120937.	75486.	239016.	83829.	102149.	9415.
6	PROCESSORS	0.	0.	0.	31602.	27639.	130040.	2568475.	11870.	107994.	0.
7	LOG-MILLS	0.	0.	0.	0.	0.	0.	468202.	0.	0.	0.
8	PRINT/PUB	9816.	7052.	776.	45679.	47628.	157951.	1055054.	282202.	23356.	102447.
9	OTHER-MFG	0.	0.	0.	0.	1200.	0.	4682.	0.	7448.	0.
10	TRANSPORT	67251.	68256.	2398.	104419.	74189.	64068.	473900.	270081.	164577.	232159.
11	COMMUNICAT	148758.	41482.	1008.	251019.	208216.	146533.	796081.	563994.	428615.	219613.
12	UTILITIES	295664.	4261692.	30487.	143225.	199258.	1066008.	873486.	254747.	682138.	293272.
13	WAT/SEW/TR	10976.	7862.	272199.	6252.	6642.	129723.	59871.	40414.	27976.	29613.
14	WHOLESALE	48777.	125776.	41217.	373889.	17275014.	3733091.	28742263.	0.	205259.	161996.
15	GAS/AUTO	107736.	234483.	66882.	289861.	203593.	106569.	557416.	95449.	44832.	7800.
16	EAT/DRINK	11331.	2513.	0.	26874.	21812.	77072.	28092.	34891.	18620.	98405.
17	OTHER-RET	38406.	70691.	16099.	253714.	112009.	322245.	351337.	522127.	138519.	298200.
18	F/I/R/E	25382.	0.	349108.	467273.	638984.	611187.	2097583.	9873363.	253417.	324400.
19	LODGING	0.	0.	0.	36344.	31787.	0.	0.	0.	0.	15582.
20	HEALTH-SER	0.	0.	0.	1356.	0.	0.	0.	0.	0.	831095.
21	EDUCAT-SER	0.	0.	0.	1356.	0.	1586.	35115.	8828.	1639.	14038.
22	OTHER-SER	62192.	8084.	73716.	223880.	125811.	646392.	592156.	1454792.	306623.	354588.
23	LOC-ROADS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
24	LOC-GOVT	924232.	977673.	109975.	98023.	90719.	33937.	291185.	252217.	306628.	110673.
25	subtotals	1751427.	42019488.	1065104.	2641588.	19185438.	7301888.	39280734.	13748804.	2819790.	3103296.
26	HOUSEHOLDS	3935116.	5230689.	664989.	4009166.	4924637.	5327373.	16161178.	7190965.	7796880.	14650490.
27	STATE-GOVT	243174.	659576.	4875.	982539.	898081.	260514.	924672.	253371.	190821.	157066.
28	FED-GOVT	1656566.	2461160.	2101.	2709279.	2386424.	1720059.	4814349.	2777508.	508444.	807394.
29	PROF-DEPR	6236223.	22214567.	843919.	1992290.	778960.	4658817.	13663904.	5729163.	3306534.	2915788.
30	TRANSFERS	0.	0.	0.	0.	0.	0.	0.	37907984.	0.	0.
31	IMP colo	8766646.	9703327.	7087.	7086584.	3356707.	7112360.	16216051.	2392400.	1940877.	1986099.
32	IMP wrld	3387448.	5058776.	439748.	49298933.	24423237.	5414575.	59967507.	6562337.	3476175.	3742288.
33	totals	25976600.	87347583.	3027823.	68720379.	55953484.	31795586.	151028396.	76562532.	20039521.	27362421.

1 EMPLOYMENT 0.2000E 03 0.2240E 03 0.8100E 02 0.4610E 03 0.3590E 03 0.1243E 04 0.1594E 04 0.5820E 03 0.1114E 04 0.1069E 04



APPENDIX E-1

TRANSACTIONS AMONG SECTORS (purchases by sectors shown at top from sectors shown at left...last rows are resource inputs)

		DOLLARS									
		21	22	23	24	25	26	27	28	29	30
		EDUCAT-SER	OTHER-SER	LOC-ROADS	LOC-GOVT	subtotals	HOUSEHOLDS	STATE-GOVT	FED-GOVT	INVESTMENT	TRANSFERS
1	LIVESTOCK	0.	0.	0.	0.	3394274.	122127.	0.	0.	0.	0.
2	OTHER-AGR	0.	2499.	0.	0.	5677351.	221832.	0.	0.	0.	0.
3	O/G-MINES	0.	0.	0.	0.	35992881.	810446.	2434569.	0.	0.	0.
4	NEW-COAL	0.	0.	0.	0.	105.	0.	0.	0.	0.	0.
5	CONSTRUCT	28947.	98854.	515826.	617995.	21320537.	4323360.	0.	946918.	75872164.	0.
6	PROCESSORS	28697.	63880.	0.	21593.	2997307.	351367.	0.	0.	0.	0.
7	LOG-MILLS	0.	0.	0.	0.	2196833.	0.	0.	0.	0.	0.
8	PRINT/PUB	1200.	233636.	281.	24584.	2095465.	10140.	3486.	34297.	0.	0.
9	OTHER-MFG	0.	179288.	0.	0.	748532.	322537.	0.	106000.	0.	0.
10	TRANSPORT	368820.	178014.	4581.	119118.	4955641.	2343889.	24693.	3270310.	0.	0.
11	COMMUNICAT	74831.	163568.	4110.	80512.	3787447.	3787338.	11940.	363367.	0.	0.
12	UTILITIES	1167719.	517901.	39395.	305731.	11255652.	27573024.	42312.	25000.	0.	0.
13	WAT/SEW/TR	10393.	55642.	0.	312139.	1434430.	1170433.	1960.	421000.	0.	0.
14	WHOLESALE	40158.	194613.	229020.	746706.	61232524.	0.	4540.	685058.	0.	0.
15	GAS/AUTO	594578.	295197.	534197.	267963.	8530545.	23693472.	164258.	0.	0.	0.
16	EAT/DRINK	0.	46320.	0.	675.	488340.	7994103.	200.	0.	0.	0.
17	OTHER-RET	291464.	1623686.	107017.	596014.	20610824.	69863213.	87389.	138000.	0.	0.
18	F/I/R/E	1281875.	1158573.	104940.	424527.	35069098.	15507556.	0.	0.	0.	0.
19	LODGING	16000.	0.	0.	0.	140290.	50052.	0.	0.	0.	0.
20	HEALTH-SER	4881.	35779.	0.	144931.	1071069.	10397620.	100.	0.	0.	0.
21	EDUCAT-SER	533111.	52633.	0.	9963327.	10613086.	1222076.	9785084.	2100911.	0.	0.
22	OTHER-SER	394456.	222170.	203329.	999280.	12654270.	9561600.	113056.	2333812.	0.	0.
23	LOC-ROADS	2000.	0.	115042.	2890910.	3022352.	0.	672288.	0.	0.	0.
24	LOC-GOVT	46034.	367384.	0.	97807.	7974511.	13379176.	2841677.	1695000.	0.	0.
25	subtotals	4885164.	5489637.	1857738.	17613812.	257263368.	192705362.	16187552.	12119673.	75872164.	0.
26	HOUSEHOLDS	19785346.	11743539.	1444286.	6852115.	156344516.	1154441.	4536249.	25011379.	0.	54413603.
27	STATE-GOVT	2353015.	115134.	28064.	76091.	10149569.	12887658.	602570.	19311779.	0.	0.
28	FED-GOVT	90099.	1799086.	52372.	238831.	36989728.	27456988.	0.	23543.	0.	0.
29	PROF-DEPR	702329.	7311640.	185217.	4692.	102216922.	8389211.	24005.	424000.	0.	0.
30	TRANSFERS	564271.	0.	0.	0.	38528411.	0.	0.	44210000.	0.	0.
31	IMP col	4386939.	1200835.	125919.	520900.	94365697.	1864430.	555382.	0.	0.	0.
32	IMP wrld	862000.	3204835.	1044.	583873.	195668604.	8162499.	250076.	132537.	0.	0.
33	totals	33629163.	30864706.	3694640.	25890364.	891526816.	252620592.	22155834.	101232911.	75872164.	54413603.

1 EMPLOYMENT 0.1524E 04 0.1246E 04 0.2070E 03 0.9100E 03 0. 0.1000E 03 0.3339E 03 0.3610E 03 0. 0.

APPENDIX B-1

TRANSACTIONS AMONG SECTORS (purchases by sectors shown at top from sectors shown at left...last rows are resource inputs)  
DOLLARS

	31	32
	EXPORTS	totals
1 LIVESTOCK	38184592.	41700993.
2 OTHER-AGR	7818500.	13717683.
3 O/G-MINES	4250662.	43489558.
4 NEW-COAL	99895.	100000.
5 CONSTRUCT	0.	102462979.
6 PROCESSORS	11025504.	14374178.
7 LOG-MILLS	5839498.	8036331.
8 PRINT/PUB	1772879.	3916267.
9 OTHER-MFG	4975217.	6152286.
10 TRANSPORT	5089798.	15684331.
11 COMMUNICAT	18026508.	25976600.
12 UTILITIES	48451595.	87347583.
13 WAT/SEW/TR	0.	3027823.
14 WHOLESALE	6798257.	68720379.
15 GAS/AUTO	23565209.	55953484.
16 EAT/DRINK	23312943.	31795586.
17 OTHER-RET	60328969.	151028396.
18 F/I/R/E	25985878.	76562532.
19 LODGING	19849179.	20039521.
20 HEALTH-SER	15893632.	27362421.
21 EDUCAT-SER	9908006.	33629163.
22 OTHER-SER	6201968.	30864706.
23 LOC-ROADS	0.	3694640.
24 LOC-GOVT	0.	25890364.
25 subtotals	337378696.	891526816.
26 HOUSEHOLDS	11160406.	252620598.
27 STATE-GOVT	0.	42951576.
28 FED-GOVT	0.	64470259.
29 PROF-DEPR	0.	111054138.
30 TRANSFERS	0.	82738411.
31 IMP co1o	0.	96785509.
32 IMP wrld	0.	204213718.
33 totals	348539104.	1746361040.

EMPLOYMENT RESOURCE REQUIREMENT

(excluding final demand sector requirements) IS	14916.090
STATE-GOVT REQUIREMENT (final demand sector) IS	333.888
FED-GOVT REQUIREMENT (final demand sector) IS	360.997
INVESTMENT REQUIREMENT (final demand sector) IS	0.
TRANSFERS REQUIREMENT (final demand sector) IS	0.
EXPORTS REQUIREMENT (final demand sector) IS	0.
TOTAL	15610.975

1 EMPLOYMENT 0. 0.

APPENDIX B-2

DIRECT INPUT COEFFICIENTS (% of purchases by sector at top of table from sectors at the left)

	1	2	3	4	5	6	7	8	9	10
	LIVESTOCK	OTHER-AGR	O/G-MINES	NEW-COAL	CONSTRUCT	PROCESSORS	LOG-MILLS	PRINT/PUB	OTHER-MFG	TRANSPORT
1 LIVESTOCK	0.039580	0.	0.	0.000080	0.	0.121311	0.	0.	0.	0.
2 OTHER-AGR	0.118912	0.036930	0.	0.	0.	0.	0.	0.	0.	0.
3 O/G-MINES	0.	0.	0.019692	0.	0.	0.	0.	0.	0.005593	0.
4 NEW-COAL	0.	0.	0.	0.001050	0.	0.	0.	0.	0.	0.
5 CONSTRUCT	0.	0.003666	0.005216	0.005770	0.165369	0.002504	0.100344	0.002185	0.001218	0.000612
6 PROCESSORS	0.	0.	0.	0.	0.000054	0.	0.	0.	0.	0.
7 LOG-MILLS	0.	0.	0.000092	0.	0.	0.	0.211679	0.	0.003740	0.000032
8 PRINT/PUB	0.	0.000050	0.000154	0.000050	0.000168	0.000889	0.004778	0.001102	0.001911	0.000759
9 OTHER-MFG	0.	0.006305	0.000391	0.010950	0.001871	0.	0.002867	0.001368	0.009503	0.011016
10 TRANSPORT	0.013674	0.004940	0.006451	0.019100	0.004068	0.006447	0.124236	0.019248	0.009968	0.012672
11 COMMUNICAT	0.001478	0.000561	0.001448	0.000840	0.002698	0.005071	0.004420	0.006862	0.009968	0.003423
12 UTILITIES	0.000906	0.007094	0.002938	0.027110	0.001628	0.005253	0.050889	0.016643	0.018312	0.001930
13 WAT/SEW/TR	0.005434	0.007327	0.000376	0.000360	0.000523	0.001854	0.000478	0.002634	0.004130	0.000092
14 WHOLESALE	0.021878	0.172039	0.016116	0.013190	0.043023	0.010494	0.031537	0.001103	0.077773	0.002862
15 GAS/AUTO	0.085903	0.014932	0.005273	0.003400	0.008984	0.000591	0.006451	0.008249	0.007186	0.003181
16 EAT/DRINK	0.	0.000025	0.000821	0.000490	0.000541	0.000646	0.001433	0.001184	0.000247	0.000209
17 OTHER-RET	0.258117	0.021565	0.001172	0.001400	0.042606	0.001286	0.028670	0.000602	0.003069	0.007838
18 F/I/R/E	0.300916	0.134558	0.004347	0.007920	0.020118	0.012456	0.022458	0.041676	0.030310	0.006615
19 LODGING	0.	0.000019	0.000191	0.	0.000058	0.	0.002270	0.	0.001267	0.
20 HEALTH-SER	0.	0.000025	0.000008	0.000500	0.000017	0.000258	0.005734	0.	0.	0.000048
21 EDUCAT-SER	0.	0.000006	0.000009	0.000090	0.	0.	0.	0.	0.000119	0.000016
22 OTHER-SER	0.029496	0.031035	0.001666	0.000930	0.043532	0.001696	0.010990	0.061971	0.013729	0.022837
23 LOC-ROADS	0.	0.	0.	0.	0.	0.	0.001792	0.	0.	0.
24 LOC-GOVT	0.038773	0.037182	0.032040	0.048000	0.003131	0.002737	0.004300	0.002683	0.005464	0.019388
25 HOUSEHOLD	0.069022	0.071845	0.141544	0.222580	0.218370	0.179699	0.253259	0.345000	0.342580	0.391105
26 STATE-GOV	0.000277	0.010096	0.023166	0.084830	0.011234	0.009289	0.016645	0.003920	0.010176	0.021697
27 FED-GOVT	0.015634	0.052994	0.198200	0.069490	0.030505	0.032573	0.031021	0.023071	0.039641	0.049941
28 PROF-DFP	0.	0.352255	0.334695	0.151370	0.078880	0.056735	0.081876	0.068651	0.062718	0.131320
29 TRANSFERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.003580
30 IMP-COLO	0.	0.029974	0.025344	0.118330	0.168529	0.376180	0.001872	0.019818	0.175643	0.267099
31 IMP-WRLD	0.	0.004577	0.178648	0.212170	0.154093	0.172029	0.	0.372030	0.165735	0.041728

APPENDIX B-2

	11	12	13	14	15	16	17	18	19	20
	COMMUNICAT	UTILITIES	WAT/SEW/TR	WHOLESALE	GAS/AUTO	EAT/DRINK	OTHER-RET	F/I/R/E	LODGING	HEALTH-SER
1 LIVESTOCK	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
2 OTHER-AGR	0.	0.	0.	0.002367	0.	0.	0.000310	0.	0.	0.
3 O/G-MINES	0.	0.401867	0.	0.	0.	0.	0.	0.	0.	0.
4 NEW-COAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5 CONSTRUCT	0.000035	0.012729	0.033436	0.001807	0.002161	0.002374	0.001583	0.001095	0.005097	0.000344
6 PROCESSORS	0.	0.	0.	0.000460	0.000494	0.004090	0.017007	0.000155	0.005389	0.
7 LOG-MILLS	0.	0.	0.	0.	0.	0.	0.003100	0.	0.	0.
8 PRINT/PUB	0.000378	0.000081	0.000256	0.000665	0.000851	0.004968	0.006986	0.003686	0.001165	0.003744
9 OTHER-MFG	0.	0.	0.	0.	0.000021	0.	0.000031	0.	0.000372	0.
10 TRANSPORT	0.002589	0.000781	0.000792	0.001519	0.001326	0.002015	0.003138	0.003528	0.008213	0.008485
11 COMMUNICAT	0.005727	0.000475	0.000333	0.003653	0.003721	0.004609	0.005271	0.007366	0.021388	0.008026
12 UTILITIES	0.011382	0.048790	0.010069	0.002084	0.003561	0.033527	0.005784	0.003327	0.034040	0.010718
13 WAT/SEW/TR	0.000423	0.000090	0.089899	0.000091	0.000119	0.004080	0.000396	0.000528	0.001396	0.001082
14 WHOLESALE	0.001878	0.001440	0.013613	0.005441	0.308739	0.117409	0.190310	0.	0.010243	0.005920
15 GAS/AUTO	0.004147	0.002684	0.022089	0.004218	0.003639	0.003352	0.003691	0.001247	0.002237	0.000285
16 EAT/DRINK	0.000436	0.000029	0.	0.000391	0.000390	0.002424	0.000186	0.000456	0.000929	0.003596
17 OTHER-RET	0.001478	0.000809	0.005317	0.003692	0.002002	0.010135	0.002326	0.006820	0.006912	0.010898
18 F/I/R/E	0.000977	0.	0.115300	0.006800	0.011420	0.019222	0.013889	0.128958	0.012646	0.011856
19 LODGING	0.	0.	0.	0.000529	0.000568	0.	0.	0.	0.	0.000569
20 HEALTH-SER	0.	0.	0.	0.000020	0.	0.	0.	0.	0.	0.030374
21 EDUCAT-SER	0.	0.	0.	0.000020	0.	0.000050	0.000233	0.000115	0.000082	0.000513
22 OTHER-SER	0.002394	0.000093	0.024346	0.003258	0.002248	0.020330	0.003921	0.019001	0.015301	0.012959
23 LOC-ROADS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
24 LOC-GOVT	0.035579	0.011193	0.036321	0.001426	0.001621	0.001067	0.001928	0.003294	0.015301	0.004045
25 HOUSEHOLD	0.151487	0.059884	0.219626	0.058340	0.088013	0.167551	0.107008	0.093923	0.389075	0.535424
26 STATE-GOV	0.009361	0.007551	0.001610	0.014298	0.016050	0.008193	0.006123	0.003309	0.009522	0.005740
27 FED-GOVT	0.063771	0.028177	0.000694	0.039425	0.042650	0.054097	0.031877	0.036278	0.025372	0.029507
28 PROF-DEP	0.240071	0.254324	0.278721	0.028991	0.013922	0.146524	0.090472	0.074830	0.165001	0.106562
29 TRANSFERS	0.	0.	0.	0.	0.	0.	0.	0.495124	0.	0.
30 IMP-COLO	0.337482	0.111089	0.002341	0.103122	0.059991	0.223690	0.107371	0.031248	0.096852	0.072585
31 IMP-WRLD	0.130404	0.057915	0.145236	0.717384	0.436492	0.170293	0.397061	0.085712	0.173466	0.136767

APPENDIX B-2

	21	22	23	24	25	26	27	28	29	30
	EDUCAT-SER	OTHER-SER	LOC-ROADS	LOC-GOVT	subtotals	HOUSEHOLDS	STATE-GOVT	FED-GOVT	INVESTMENT	TRANSFERS
1 LIVESTOCK	0.	0.	0.	0.	0.000483	0.	0.	0.	0.	0.109556
2 OTHER-AGR	0.	0.000081	0.	0.	0.000878	0.	0.	0.	0.	0.022432
3 O/G-MINES	0.	0.	0.	0.	0.003208	0.109884	0.	0.	0.	0.012196
4 NEW-COAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.000287
5 CONSTRUCT	0.000861	0.003203	0.139615	0.023870	0.017114	0.	0.009354	1.000000	0.	0.
6 PROCESSORS	0.000853	0.002070	0.	0.000834	0.001391	0.	0.	0.	0.	0.031633
7 LOG-MILLS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.016754
8 PRINT/PUB	0.000036	0.007570	0.000076	0.000950	0.000040	0.000157	0.000339	0.	0.	0.005087
9 OTHER-MFG	0.	0.005809	0.	0.	0.001277	0.	0.001047	0.	0.	0.014274
10 TRANSPORT	0.010967	0.005768	0.001240	0.004601	0.009278	0.001115	0.032305	0.	0.	0.014603
11 COMMUNICAT	0.002225	0.005300	0.001112	0.003110	0.014992	0.000539	0.003589	0.	0.	0.051720
12 UTILITIES	0.034723	0.016780	0.010663	0.011809	0.109148	0.001910	0.000247	0.	0.	0.139013
13 WAT/SEW/TR	0.000309	0.001803	0.	0.012056	0.004633	0.000088	0.004159	0.	0.	0.
14 WHOLESALE	0.001194	0.006305	0.061987	0.028841	0.	0.000205	0.006767	0.	0.	0.019505
15 GAS/AUTO	0.017680	0.009564	0.144587	0.010350	0.093791	0.007414	0.	0.	0.	0.067611
16 EAT/DRINK	0.	0.001501	0.	0.000026	0.031645	0.000009	0.	0.	0.	0.066888
17 OTHER-RET	0.008667	0.052607	0.028965	0.023021	0.276554	0.003944	0.001363	0.	0.	0.173091
18 F/I/R/E	0.038118	0.037537	0.028403	0.016397	0.061387	0.	0.	0.	0.	0.074557
19 LODGING	0.000476	0.	0.	0.	0.000198	0.	0.	0.	0.	0.056950
20 HEALTH-SER	0.000145	0.001159	0.	0.005598	0.041159	0.000005	0.	0.	0.	0.045601
21 EDUCAT-SER	0.015853	0.001705	0.	0.384828	0.004838	0.441648	0.020753	0.	0.	0.028427
22 OTHER-SER	0.011730	0.007198	0.055034	0.038597	0.037850	0.005103	0.023054	0.	0.	0.017794
23 LOC-ROADS	0.000059	0.	0.031138	0.111660	0.	0.030344	0.	0.	0.	0.
24 LOC-GOVT	0.001369	0.011903	0.	0.003778	0.052962	0.128259	0.016744	0.	0.	0.
25 HOUSEHOLD	0.588339	0.380484	0.390914	0.264659	0.004570	0.204743	0.247068	0.	1.000000	0.032021
26 STATE-GOV	0.069969	0.003730	0.007596	0.002939	0.051016	0.027197	0.190766	0.	0.	0.
27 FED-GOVT	0.002679	0.058289	0.014175	0.009227	0.108689	0.	0.000233	0.	0.	0.
28 PROF-DEP	0.020885	0.236993	0.050131	0.000181	0.033209	0.001083	0.004188	0.	0.	0.
29 TRANSFERS	0.016779	0.	0.	0.	0.	0.	0.436716	0.	0.	0.
30 IMP-COLO	0.130450	0.038906	0.034082	0.020119	0.007380	0.025067	0.	0.	0.	0.
31 IMP-WRLD	0.025633	0.103835	0.000283	0.022552	0.032311	0.011287	0.001309	0.	0.	0.

APPENDIX B-3 Direct and Indirect Requirements Per Dollar of Output Delivered to Final Demand, 1980

(I-A) INVERSE MATRIX

	1	2	3	4	5	6	7	8	9	10
	LIVESTOCK	OTHER-AGR	O/G-MINES	NEW-COAL	CONSTRUCT	PROCESSORS	LOG-MILLS	PRINT/PUB	OTHER-MFG	TRANSPORT
1 LIVESTOCK	1.0422	0.0003	0.0003	0.0005	0.0006	0.1268	0.0009	0.0007	0.0006	0.0007
2 OTHER-AGR	0.1294	1.0391	0.0003	0.0005	0.0007	0.0161	0.0010	0.0007	0.0009	0.0008
3 O/G-MINES	0.0180	0.0147	1.0331	0.0303	0.0214	0.0170	0.0594	0.0334	0.0389	0.0291
4 NEW-COAL	0.	0.	0.	1.0011	0.	0.	0.	0.	0.	0.
5 CONSTRUCT	0.0129	0.0132	0.0140	0.0191	1.2092	0.0113	0.1710	0.0168	0.0160	0.0162
6 PROCESSORS	0.0069	0.0020	0.0015	0.0024	0.0036	1.0024	0.0047	0.0034	0.0033	0.0037
7 LOG-MILLS	0.0014	0.0004	0.0004	0.0004	0.0006	0.0004	1.2694	0.0006	0.0053	0.0007
8 PRINT/PUB	0.0049	0.0020	0.0010	0.0014	0.0024	0.0024	0.0089	1.0034	0.0039	0.0028
9 OTHER-MFG	0.0018	0.0073	0.0009	0.0119	0.0033	0.0007	0.0070	0.0029	1.0107	0.0124
10 TRANSPORT	0.0224	0.0095	0.0099	0.0246	0.0107	0.0125	0.1690	0.0266	0.0175	1.0202
11 COMMUNICAT	0.0127	0.0069	0.0059	0.0079	0.0116	0.0114	0.0189	0.0171	0.0199	0.0140
12 UTILITIES	0.0417	0.0342	0.0300	0.0711	0.0491	0.0393	0.1402	0.0776	0.0772	0.0666
13 WAT/SEW/TR	0.0102	0.0104	0.0023	0.0033	0.0033	0.0048	0.0048	0.0062	0.0078	0.0038
14 WHOLESALE	0.1575	0.2118	0.0410	0.0509	0.1021	0.0528	0.1164	0.0516	0.1275	0.0572
15 GAS/AUTO	0.1236	0.0377	0.0277	0.0387	0.0489	0.0390	0.0688	0.0570	0.0544	0.0558
16 EAT/DRINK	0.0092	0.0063	0.0076	0.0112	0.0127	0.0092	0.0204	0.0167	0.0152	0.0169
17 OTHER-RET	0.3579	0.0818	0.0628	0.0985	0.1600	0.1113	0.2093	0.1408	0.1364	0.1572
18 F/I/R/E	0.4158	0.1840	0.0253	0.0411	0.0639	0.0855	0.0906	0.0929	0.0777	0.0548
19 LODGING	0.0002	0.0002	0.0003	0.0002	0.0003	0.0001	0.0032	0.0002	0.0015	0.0002
20 HEALTH-SER	0.0120	0.0084	0.0092	0.0150	0.0159	0.0117	0.0320	0.0205	0.0193	0.0223
21 EDUCAT-SER	0.0272	0.0215	0.0190	0.0290	0.0126	0.0112	0.0209	0.0156	0.0162	0.0227
22 OTHER-SER	0.0609	0.0485	0.0142	0.0208	0.0719	0.0211	0.0545	0.0874	0.0382	0.0496
23 LOC-ROADS	0.0076	0.0060	0.0053	0.0080	0.0031	0.0029	0.0076	0.0038	0.0040	0.0059
24 LOC-GOVT	0.0656	0.0523	0.0458	0.0695	0.0272	0.0251	0.0459	0.0334	0.0350	0.0512
25 HOUSEHOLDS	0.2722	0.1879	0.2094	0.3310	0.3686	0.2640	0.5684	0.4760	0.4596	0.5152

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	11	12	13	14	15	16	17	18	19	20
	COMMUNICAT	UTILITIES	WAT/SEW/TR	WHOLESALE	GAS/AUTO	EAT/DRINK	OTHER-RET	F/I/R/E	LODGING	HEALTH-SER
1 LIVESTOCK	0.0003	0.0003	0.0006	0.0002	0.0003	0.0009	0.0024	0.0003	0.0014	0.0010
2 OTHER-AGR	0.0003	0.0003	0.0006	0.0026	0.0010	0.0007	0.0013	0.0002	0.0009	0.0010
3 O/G-MINES	0.0170	0.4415	0.0260	0.0053	0.0095	0.0280	0.0119	0.0102	0.0427	0.0423
4 NEW-COAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5 CONSTRUCT	0.0081	0.0251	0.0571	0.0046	0.0074	0.0110	0.0078	0.0062	0.0220	0.0202
6 PROCESSORS	0.0016	0.0013	0.0029	0.0011	0.0017	0.0060	0.0183	0.0014	0.0090	0.0049
7 LOG-MILLS	0.0003	0.0003	0.0005	0.0001	0.0002	0.0003	0.0041	0.0002	0.0006	0.0008
8 PRINT/PUB	0.0012	0.0009	0.0025	0.0010	0.0017	0.0062	0.0079	0.0050	0.0032	0.0065
9 OTHER-MFG	0.0005	0.0006	0.0010	0.0002	0.0003	0.0006	0.0005	0.0005	0.0015	0.0015
10 TRANSPORT	0.0060	0.0064	0.0073	0.0028	0.0039	0.0060	0.0067	0.0065	0.0158	0.0184
11 COMMUNICAT	1.0102	0.0049	0.0095	0.0054	0.0078	0.0103	0.0096	0.0118	0.0320	0.0222
12 UTILITIES	0.0398	1.0756	0.0604	0.0123	0.0220	0.0663	0.0277	0.0236	0.1001	0.0976
13 WAT/SEW/TR	0.0024	0.0018	1.1020	0.0007	0.0011	0.0062	0.0017	0.0018	0.0052	0.0059
14 WHOLESALE	0.0265	0.0301	0.0655	1.0160	0.3267	0.1463	0.2105	0.0176	0.0638	0.0758
15 GAS/AUTO	0.0273	0.0242	0.0645	0.0125	1.0192	0.0290	0.0217	0.0173	0.0549	0.0702
16 EAT/DRINK	0.0074	0.0062	0.0123	0.0030	0.0050	1.0104	0.0056	0.0055	0.0175	0.0261
17 OTHER-RET	0.0649	0.0545	0.1195	0.0271	0.0438	0.0818	1.0518	0.0532	0.1559	0.2107
18 F/I/R/E	0.0218	0.0196	0.1830	0.0157	0.0284	0.0467	0.0341	1.1631	0.0615	0.0755
19 LODGING	0.0001	0.0002	0.0002	0.0006	0.0008	0.0002	0.0002	0.0001	1.0002	0.0008
20 HEALTH-SER	0.0095	0.0079	0.0164	0.0035	0.0060	0.0105	0.0072	0.0066	0.0221	1.0611
21 EDUCAT-SER	0.0204	0.0153	0.0271	0.0030	0.0050	0.0082	0.0062	0.0064	0.0216	0.0224
22 OTHER-SER	0.0150	0.0119	0.0523	0.0077	0.0108	0.0340	0.0140	0.0302	0.0421	0.0480
23 LOC-ROADS	0.0057	0.0042	0.0074	0.0008	0.0013	0.0020	0.0015	0.0016	0.0056	0.0054
24 LOC-GOVT	0.0494	0.0368	0.0642	0.0067	0.0110	0.0175	0.0130	0.0138	0.0483	0.0467
25 HOUSEHOLDS	0.2167	0.1795	0.3759	0.0799	0.1399	0.2427	0.1655	0.1533	0.5136	0.6942

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	21	22	23	24	25
	EDUCAT-SER	OTHER-SER	LOC-ROADS	LOC-GOVT	subtotals
1 LIVESTOCK	0.0012	0.0011	0.0009	0.0012	0.0016
2 OTHER-AGR	0.0011	0.0009	0.0012	0.0012	0.0017
3 D/G-MINES	0.0558	0.0351	0.0385	0.0517	0.0647
4 NEW-COAL	0.	0.	0.	0.	0.
5 CONSTRUCT	0.0228	0.0192	0.1909	0.0705	0.0332
6 PROCESSORS	0.0061	0.0064	0.0051	0.0068	0.0081
7 LOG-MILLS	0.0009	0.0008	0.0009	0.0010	0.0014
8 PRINT/PUB	0.0029	0.0100	0.0033	0.0044	0.0040
9 OTHER-MFG	0.0016	0.0070	0.0019	0.0019	0.0022
10 TRANSPORT	0.0217	0.0135	0.0112	0.0201	0.0159
11 COMMUNICAT	0.0175	0.0162	0.0154	0.0198	0.0234
12 UTILITIES	0.1302	0.0815	0.0890	0.1201	0.1481
13 WAT/SEW/TR	0.0054	0.0056	0.0043	0.0185	0.0078
14 WHOLESALE	0.0813	0.0702	0.1861	0.1280	0.1150
15 GAS/AUTO	0.0939	0.0615	0.2136	0.1094	0.1206
16 EAT/DRINK	0.0243	0.0179	0.0199	0.0239	0.0389
17 OTHER-RET	0.2254	0.1994	0.2158	0.2454	0.3452
18 F/I/R/E	0.1108	0.0903	0.0970	0.1104	0.1039
19 LODGING	0.0008	0.0002	0.0004	0.0005	0.0004
20 HEALTH-SER	0.0325	0.0230	0.0262	0.0374	0.0518
21 EDUCAT-SER	1.0388	0.0214	0.0184	0.4148	0.0344
22 OTHER-SER	0.0497	1.0346	0.0961	0.0897	0.0579
23 LOC-ROADS	0.0056	0.0050	1.0366	0.1211	0.0083
24 LOC-GOVT	0.0480	0.0437	0.0389	1.0510	0.0721
25 HOUSEHOLDS	0.7538	0.5072	0.6083	0.7336	1.2095



APPENDIX C  
METHODOLOGY AND DATA SOURCES

The interindustry model identifies the interdependent structure of an economy. No producing sector is autonomous (independent of the other sectors); rather, each sector interacts with other sectors (industrial, commercial, labor, government) through the purchases of goods and services and the sale of outputs. Structural interdependence means, quite simply, that the activities of one sector have impacts on others. The identification of the nature and magnitude of this interdependence is one of the most useful results of the interindustry model.

The model is driven by what are termed final demands. Final demands (as opposed to intermediate demands) reflect the demand for goods and services for export or sale to state and federal government. Intermediate demands, on the other hand, reflect the demand for goods and services which are processed in the region before becoming available for final consumption. Thus, changes in final demands result in changes in the processing (or intermediate) sectors of the economy. The primary purpose of the interindustry model is to trace these impacts throughout the economy. Tracing these direct and indirect impacts allows the derivation of the multiplier effects on production, income, and employment, and also allows the use of the model in providing consistent forecasts of economic activity.

### PROCEDURES FOLLOWED

The discussion of procedures followed in conducting the research may be conveniently condensed into several categories including: delineation of economic sectors, the data collection effort, and data processing. Each is discussed, as briefly as possible, in the following pages.

### SECTOR DELINEATIONS

The input-output technique requires the separation of the economy into various economic entities or "sectors." Total output, by inter-industry accounting procedures, is the aggregate value of all sales and purchases that take place, i.e., the total sales or purchases during a year. This total output must be divided up into sectors in order to assess the interindustry structural dependence that prevails. The model structures economic activity into two major components, suppliers (or sellers) and purchases (or users). Each of these is further subdivided according to the following scheme. Suppliers include: (1) intermediate or processing suppliers who are producers who must purchase inputs to be processed into output which they sell to final users or as inputs to other processors; and (2) primary suppliers whose output is not directly dependent on purchased inputs. This latter category includes non-local suppliers (or imports). Purchasers include: (1) intermediate or processing purchasers who buy the outputs of suppliers for use as inputs for further processing; and (2) final purchasers who buy the outputs of suppliers in their final form and for final use. This latter category includes purchases by non-local users (or sales to exports). The level of demand by final purchasers, and

and its composition, are determined outside the processing sector. Production to meet the exogenously determined final demands generates intermediate purchases and sales. Primary suppliers and final purchasers may or may not be one and the same. However, in the interindustry model, their activities are treated as if they were completely independent of one another.

In summary, the two major divisions of suppliers are the intermediate suppliers, which are called the processing sector, and the primary suppliers, which are referred to as the final payments sector. (The suppliers are conventionally shown along the left border of an interindustry table.) The two major divisions of the purchasers are the intermediate purchasers, which are labeled as the processing sector (just as with the intermediate suppliers) and the final purchasers which are labeled final demand. (The purchasers are conventionally shown along the top of an interindustry or input-output table.) It is within this general framework that a further sector disaggregation must be accomplished.

The ideal sector delineation would allow unique recognition of industries or producer groups which provide a homogenous good or service. This idea is very difficult to achieve because of the large amounts of time and finance required for detailed disaggregation, disclosure problems, and lack of data. Any of these factors or a combination of them lead to a violation of the homogenous product ideal.

Sector selection, in addition to dependence upon financing, time, and data availability, is determined to a large extent by the objectives of the study. Research objectives can often be achieved without detailed disaggregation in all sectors. The final delineation of the

sectoring plan adopted for this study is shown in Appendix A. A discussion of a non-conventional accounting sector and how it is used follows. This sector is the transfer account. There is also an explanation of the profit and depreciation sector.

A unique accounting device employed in the La Plata-Montezuma County interindustry model is the transfer sector. This accounting device allows for two distinctive characteristics that are not usually found in other regional interindustry studies. First, the assumption that transfer payments cancel in the net is dropped. Second, the model handles financial balances in such a manner as to give rise to a definition of regional income more analogous to the definition of national income. There are several reasons for this.

First, insurance premiums were divided so that a value equal to loss experiences was separated from other revenues. This value equal to loss experiences was the prorated among the various sectors in accordance with their premium payments and directly charged into the transfer row. Thus, the loss experience is not part of the total gross output of the insurance and real estate sector. The transfer column in turn is shown as making the claim payments to the various sectors.

Second, transfer payments to household are handled through the transfer account. Taxes collected in the region are always shown as being paid to the respective government accounts, i.e., local and county tax accounts, State of Colorado, or federal government. Any inter-governmental transfer is shown as a sale by the recipient and a purchase by the grantor. In turn, the account that grants the transfer payment(s) to the household sector is shown as making a purchase from the transfer account row in the amount of the transfer payments(s).

The transfer account column then makes the payment to the household account.

Where enterprise accounting was employed, the profit sector includes after-tax profits, charges to reserves for bad debts, capital loss amortization, and outlays for rents and royalties. Where government fund accounting was employed, the profit sector includes surplus of current revenues over current expenditures, the value of capital expenditures appropriated out of current revenues, contributions to bond indenture sinking funds out of current revenues, net charges out of current revenues to any other reserve fund (e.g., contingency funds), and rent payments.

The depreciation sector (included in profits) includes both depreciation and net inventory depletions. Inventory depletions are, relatively speaking, insignificant and are placed with depreciation charges. Similarly, the net inventory accumulation values were incorporated in the investment sector.

With the exception of the intersection of the household row and the transfer column, the household row represents wages and salaries paid subject to withholding.

#### QUESTIONNAIRE DESIGN AND USE

Previous experience with questionnaires employed to obtain primary information for interindustry models suggested that a questionnaire, as such, should not be used in the pursuit of the primary data. The reason behind this is that no firm accounts for expenditure and revenue patterns on a Standard Industrial Classification (SIC) basis, the language ultimately employed in an interindustry model. Rather, a firm's

books are designed around process or product activities. The use of a questionnaire, either by mail or by interview, presupposes adequate translation from a firm's accounting language into SIC codes. The typical entrepreneur or manager does not ordinarily work with SIC descriptions, a rather precise and technical language.

Accordingly, a determination was made to conduct all interviews in a basic accounting language tailored to the individual firms involved and for the researcher to make the translation to SIC classification. A large majority of the primary data were originally collected in field notes that described the detail behind profit and loss statements for the firms interviewed.

Not all interviews could, however, be conducted as planned. It was found, for example, that some firms would have to refer for legal advice while others did not want to reveal information in the form desired. Even though it was established that the research should not solicit primary data through the mail, it was necessary to design a questionnaire for use both as an interview focal point and as an item that could be left with an interviewed firm.

The questionnaire was designed to fit three sheets of paper. A cover sheet was used to briefly explain the nature of the research and to solicit information on the nature of the firm's product lines, the number of employees, and level of capacity utilization. Outlay patterns, both of a cash flow and a non-cash flow nature, were the concern of the second sheet; information on sales distribution was solicited on the third. Both sales and outlay patterns were disaggregated by interindustry study sector descriptions and regionalized according to (a) LaPlata-Montezuma counties, (b) Colorado other than the study

region, and (c) activity outside Colorado. The level of production capacity utilization question was used to provide general background information.

#### CONDUCT OF THE SURVEY

Interview schedules were arranged by telephone between three days and a week in advance. Every effort was made to gain an interview with the person who would have immediate authority to release information. The length of time spent on an individual interview varied from firm to firm. Several were conducted in less than an hour; some took place over several days. The interviews were conducted over a six-month period.

#### PROCESSING THE DATA

Information gathered on the outlay and sales patterns for any given enterprise was tabulated to conform to the sector delineations and regional descriptions as defined in Appendix A. Care was exercised at this step to assure a balance between outlays and sales. Any anomalies were checked and corrected before proceeding further.

The next step was to aggregate questionnaire forms within a sector and to expand the information on the basis of state employment and payroll data to represent gross flows. An iterative process was used to accomplish this so that the relative composition of a given sector delineated for the La Plata-Montezuma County interindustry model would be more truly reflected. The final iteration produced gross flow patterns for the respective sectors delineated in the model. The gross flows identified in this manner provide the border totals for the initial transactions statement.

Reconciling discrepancies in any given transaction cell is to be expected; only if the research yielded perfect knowledge about outlays and sales would this be avoided. A discrepancy can emanate from one of several sources or a combination thereof. The sales or purchases of one industry to or from another industry can be misrepresented, or the total gross output value for individual sectors can be in error. In the latter, there is an aggregate distribution error in both outlays and sales for the sector. Each discrepancy is examined individually and reconciled on a case-by-case basis. Fortunately, the sources of relatively large discrepancies can be isolated and remedied through additional examination. Small discrepancies were reconciled by using imports from and exports to the world other than Colorado as residual accounts.

#### DATA SOURCES BY SECTOR

##### Agricultural Production      SIC 01,02,07

Colorado. Department of Agriculture. Colorado Crop and Livestock Reporting Service. Colorado Agricultural Statistics. Annual.

Colorado State University. Cooperative Extension Service Data. Department of Economics.

Industry survey data.

U.S. Department of Commerce. Bureau of the Census. Census of Agriculture: 1974. Volume 1, Area Reports, part 41, Colorado, Section 2, County Data. Washington, D.C.: Government Printing Office, 1972.

Colorado Agricultural Statistics reports crops on a production and market value basis. By contrast the total gross output in the inter-industry model is reported on a market receipts basis. The implication of this difference is not too critical when virtually all production is



marketed; this is not the case with hay, however, a major crop in the study region. Thus, to obtain an estimate of the market receipts from hay, the ratio of hay marketings reported in the 1974 Federal Census of Agriculture to the 1974 market value of hay reported in Colorado Agricultural Statistics was applied to the latter's 1980 report.

Data on the value of marketings of livestock are not published on a county basis in Colorado. Thus, the value of the total gross output of the livestock sector in the study region was determined from information secured from the Cooperative Extension Service and by prorating state and federal data.

Metal Mining, Oil and Natural Gas Production, and Nonmetal Mining      SIC 10,13,14

Colorado. Department of Natural Resources. Division of Mines. A Summary of Mineral Industry Activities in Colorado. Part II. Metal-Nonmetal. Annual.

Colorado. Department of Natural Resources. Oil and Gas Conservation Commission. Oil and Gas Statistics. Annual.

Industry survey data.

Pederson, John A., and Rudawsky, Oded, "The Role of Minerals and Energy in the Colorado Economy." (U.S. Bureau of Mines Grant No. G-0122090.) Golden, Colorado: Department of Mineral Economics, Colorado School of Mines, 1974. (Photocopy reproduction.)

Total gross output values for metal mining, oil and natural gas production, and nonmetal mining, were taken from the State of Colorado publications.

Construction      SIC 15,16,17

Colorado. Department of Labor and Employment. Files.

Industry survey data.

Information gained by interviews with contractors was used to calculate a ratio between contract value and outlay for labor on a two-digit SIC level. This ratio was then applied to the annualized employment and wage data for 1980 provided by the Colorado Department of Labor and Employment to estimate total gross output.

Manufacturing SIC 20,24,25,27,28,29,32,33,34,35,38,39

Colorado. Department of Labor and Employment. Colorado Manpower Review. Monthly.

Colorado. Department of Labor and Employment. Files.

Industry survey data.

Transportation and Communication SIC 40,41,42,45,47,48

Colorado. Department of Labor and Employment. Files.

Colorado. Public Utilities Commission. Files.

Colorado. State Auditor. Files.

Industry survey data.

Information pertinent to railroad and telephone communications was gained from filed PUC reports and survey. Because of the nature of the accounting systems employed by the firms involved, a significant amount of prorating was required to scale the data to approximate the two-county conditions.

Where the airports are operated by local public authorities, the relevant information was obtained from reports filed with the Colorado State Auditor.

Data on employment and earnings for components other than rail and air transportation sectors were obtained for the year 1980 from the Colorado Department of Labor and Employment.

Electric and Natural Gas Utilities SIC 491,492,493

Colorado. Department of Labor and Employment. Files.

Colorado. Public Utilities Commission. Files.

Colorado. State Auditor. Files.

Industry survey data.

A certain amount of prorating and imputation was involved in this sector because of geographic location of activity. Electric activities under the control of local public authorities were identified by examining 1980 reports filed with the State Auditor. Finally, information gained from the Colorado Department of Labor and Employment and from interviews provided cross checks throughout the estimation of the activities of this sector.

Wholesale Trade SIC 50,51; also

Retail Trade SIC 52,53,54,55,56,57,58,59

Colorado. Department of Labor and Employment. Colorado Manpower Review. Monthly.

Colorado. Department of Labor and Employment. Files.

Colorado. Department of Revenue. Annual Report. Annual.

Industry survey data.

Finance, Insurance, and Real Estate SIC 60,61,62,63,64,65,66

Colorado. Department of Labor and Employment. Colorado Manpower Review. Monthly.

Colorado. Department of Labor and Employment. Files.

Colorado. Department of Regulatory Agencies. Division of Insurance. Insurance Industry in Colorado: Statistical Report. Annual.

Colorado. Department of Revenue. Annual Report. Annual.

County Clerk Office, respective counties. Files.

Federal Credit Banks of Wichita. Files.

Federal Home Loan Bank Board. Combined Financial Statements Member Savings and Loan Associations of the Federal Home Loan Bank System. Annual.

Industry survey data.

Sheshunoff & Company, Inc. The Banks of Colorado.  
(A private publication.) Annual.

The output value of the finance sector was entered in the La Plata-Montezuma County interindustry model as the estimated value of charges for interest incurred within the region. Interest earnings by commercial banks were readily identified in the Sheshunoff publication; likewise, the Federal Credit Banks of Wichita provided data relevant to the operations of the Production Credit Association and Federal Land Bank Association. Regional information on the activities of savings and loan associations is not readily available so the data published for Colorado in the Federal Home Loan Bank Board's Combined Financial Statements were prorated by a wage and salary formula for the two-county region. Survey data were used both as a cross check to published data and to estimate financing from outside the region, e.g., certain school bonds, Rural Electrification Association loans, insurance company loans, and so forth.

Information gained in previous interviews with several major insurance companies suggested that a precise accounting for insurance premiums paid on per county basis was a near impossibility. Another difficulty observed was with respect to loss claims; specifically, in a small region the losses incurred by any one economic sector cannot be

predicted with any certainty. Thus, for the La Plata-Montezuma County interindustry model, the insurance sector was handled as follows.

Gross insurance premiums paid in the study region were approximated by prorating premiums paid in the State of Colorado by a personal adjusted gross income figure. Premiums paid in Colorado are reported in the State Division of Insurance's Statistical Report; personal income is reported in the Department of Revenue's Annual Report. The state loss experience ratio was then used to split gross premiums paid; the loss portion was charged to the transfer account in the La Plata-Montezuma County interindustry model and the balance was charged as gross output of the insurance sector. Accordingly, the transfer row collects the portion of premiums paid that subsequently reimburses for losses and the transfer account column distributes the same to contractors, auto dealers, health practitioners, and so forth. (The reader is alerted to the fact that the transfer account is also used for other purposes in the model; see the section on transfer account.)

Information on documentary fees paid for real estate transactions was secured from the county clerks in the respective counties. The fee information was used to estimate the gross value of transactions.

Services SIC 70,72,73,74,75,76,78,79,81,86,89

Colorado. Department of Labor and Employment. Colorado Manpower Review. Monthly.

Colorado. Department of Labor and Employment. Files.

Colorado. Department of Revenue. Annual Report. Annual.

Industry survey data.

U.S. Department of Commerce. Bureau of the Census.  
Census of Selected Service Industries, 1972: Area  
 Series, Colorado, 72-A-6. Washington, D.C.:  
 Government Printing Office, 1974.

Sales by the hotels and other lodging facilities sector were estimated by annualizing the pertinent information reported in the Department of Revenue's Annual Report.

Health SIC 80

Colorado. Department of Labor and Employment. Files.

Colorado. Department of Revenue. Annual Report.  
 Annual.

Colorado. State Auditor. Files.

Industry survey data.

Health facilities owned by local public authorities had current financial statements on file with the State Auditor.

Education SIC 82

Colorado. Department of Education. Files.

Colorado. Department of Education. Revenues and  
 Expenditures: Colorado School Districts. Annual.

Industry survey data.

Information on public school districts is published on an annual basis in Revenues and Expenditures. Information on the Colorado Extension Service was secured directly. All data were annualized and distributed on the basis of survey information.

Water, Sewer, and Trash SIC 494,495,496,497; also

Local and County Roads; also

Local and County Government; also

Local and County Taxes

Colorado. State Auditor. Files.

Industry survey data.

The 1980 audit reports for all local and county government authorities were examined and the data contained therein were aggregated. Information gained in select interviews facilitated the distribution of the various sectors' outlays.

#### Households

Colorado. Department of Labor and Employment. Files.

Colorado. Department of Revenue. Annual Report.  
Annual.

Colorado. Public Employees Retirement Association.  
Files.

Community Services Administration. Federal Outlays in Colorado. Annual. (Prior to fiscal 1975 published by Office of Economic Opportunity.)

Industry survey data.

U.S. Department of Commerce. Bureau of the Census. Census of the Population, 1970: General Social and Economic Characteristics, Final Report, Colorado, PC (1)-C7. Washington, D.C.: Government Printing Office, 1972.

U.S. Department of the Treasury. Internal Revenue Service. Statistics of Income 1969, ZIP Code Area Data from Individual Income Tax Returns. Washington, D.C.: Government Printing Office, 1972.

Household income in the La Plata-Montezuma County interindustry model is shown as emanating from wages and salaries subject to withholding, proprietorship, partnership, and Sub-Chapter S Corporation income, interest, rent, and dividend income, and transfer payments. The Department of Revenue's Annual Report publishes, on a county basis, personal adjusted gross income figures.

Audit reports for the respective counties provided information on the level of payments made to household by the two counties' department of social services. An estimate of payments by the Colorado Public Employees Retirement Association was made based on information provided by the Association. The value of transfer payments made by the U.S. Government was approximated by the reported information in Federal Outlays. Life insurance distributions were estimated in accordance with the procedure described in the insurance section of this writing.

Payments made to the household account by the respective regional economic sectors reflect an estimate of wages paid subject to withholding. For most of the private enterprise portion of the economy, this estimate reflects the place of work data base provided by the Colorado Department of Labor and Employment files. Estimates on the earnings of agricultural, railroad, and government employees reflect the information sources peculiar to those sectors. The transfer column entry for households is a closing entry that is described in detail in the transfer account section. Essentially it is an entry that brings non-wage income to the household sector.

Households were not surveyed to gain information on their outlay patterns. Rather, there was a reliance on the sales information provided for regional trade sectors and other secondary data sources.

State Government; also

Federal Government

Colorado. Department of Education. Revenues and Expenditures: Colorado School Districts. Annual.

Colorado. Department of Highways. Colorado's Annual Highway Report. Annual.



Colorado. Department of Natural Resources. Division of Wildlife. Colorado Big Game Harvest. Annual.

Colorado. Department of Natural Resources. State Board of Land Commissioners. Summary of Transactions. Annual.

Colorado. Department of Planning and Budget. Files.

Colorado. Department of Revenue. Annual Report. Annual.

Colorado. State Auditor. Files.

Colorado. Public Employees Retirement Association. Files.

Colorado. Public Utilities Commission. Files.

Community Services Administration. Federal Outlays in Colorado. Annual. (Prior to fiscal 1975 published by Office of Economic Opportunity.)

Industry survey data.

Sheshunoff & Company, Inc. The Banks of Colorado. (A private publication.) Annual.

U.S. Department of the Treasury. Bureau of Government Financial Operations. Combined Statement of Receipts, Expenditures, and Balances of the United States Government. Washington, D.C.: Government Printing Office. Annual.

U.S. Department of the Treasury. Internal Revenue Service. Statistics of Income, ZIP Code Area Data from Individual Income Tax Returns. Washington, D.C.: Government Printing Office.

Total gross output for the government sectors is defined in terms of the estimate of revenues from all sources. For private enterprise in the endogenous portion of the model, an estimate was made of income and payroll tax liabilities and fees and royalties paid by each respective sector. There is no real cross check against these estimates because neither Colorado nor the U.S. Government reports business tax liabilities on a county basis. Further, previous research experience

has demonstrated that prorating the reported state level of collections (reported in the Treasury's Combined Statement of Receipts, Expenditures, and Balances and the Department of Revenue's Annual Report) by such factors as population or personal income produces questionable results.

Personal tax and fee liabilities were much more readily estimated by using such publications as the Department of Revenue's Annual Report, the Division of Wildlife's Big Game Harvest, and the IRS's ZIP Code Area Data. The exports by the State of Colorado include estimates of sales taxes.

For the U.S. Government, the publication Federal Outlays was used as a first approximation of expenditures. Select interviews with the larger agencies, such as the National Park Service, provided the information to estimate agency operating expenditure patterns. Information on direct payments for such things as schools, interest on government securities held by commercial banks, highways, and local government activities was taken from the Colorado Department of Education's Revenues and Expenditures, Sheshunoff's The Banks of Colorado, Colorado's Annual Highway Report, and files of the Colorado State Auditor.

State of Colorado Expenditures were first approximated by information contained in regionalized budgets provided by the Department of Planning and Budget. This information was on a state planning region basis so modification was necessary on an agency-by-agency basis. Contacts were made with the larger agencies such as the Division of Wildlife and the State Department of Highways to accommodate this requirement.

Survey information was used to estimate the investment column. The value of investment was then set against the value of the profit and depreciation row. Out of the net difference, the estimate of entrepreneurial income was taken and closed to households; the residual after accounting for entrepreneurial income was treated as a regional capital shortage.

Imports — Colorado; also

Exports — Colorado; also

Imports — World; also

Exports — World

Imports and exports in La Plata-Montezuma County interindustry model were estimated by using survey information. Also, in the process of reconciling and balancing the transactions table, the entries in these rows and columns were used as the adjustment mechanism.

#### Labor

Colorado. Department of Labor and Employment. Colorado Manpower Review. Monthly.

Colorado. Department of Labor and Employment. Files.  
Industry survey data.

U.S. Department of Commerce. Bureau of the Census. Census of Population, 1980: General Social and Economic Characteristics.

The labor estimates are annualized full-time equivalents of wage and salaried employees. Further, the estimates refer to work performed within the study region. The private sector of the economy, with the exception of agriculture, was estimated by using the quarterly report information by place of work submitted to the Colorado Department of

Labor and Employment. This information was secured for 1980 and 1981-82 on a three-digit SIC basis.

No single source or agency seems to be able to provide an adequate estimate of annualized full-time equivalent employment in agriculture. Consequently, using Colorado State University farm and ranch survey data and wage rates published in the Colorado Agricultural Statistics, full-time employment equivalents were imputed. Employment by government agencies was estimated by using survey information and County Business Patterns.

Caution is exercised to the fact that employment levels as defined in the La Plata-Montezuma County interindustry model do not approximate employment levels as defined in some commonly distributed publications. The Colorado Manpower Review, for example, publishes county estimates on the resident adjusted labor force. Aside from the definitional difference, certain methods used to estimate the resident adjusted labor force are extremely questionable. The reader is referred to the January 1977 Manpower Review for a complete discussion on this matter.

## APPENDIX D -- IDENTIFICATION OF OCCUPATIONS

## OES # OCCUPATIONAL TITLE

## 10 MANAGERS &amp; OFFICE OCCUPATIONS

10000 MANAGERS AND OFFICERS  
 10001 PUBLIC ADMINISTRATION INSPECTORS  
 10009 CONSTRUCTION INSPECTOR  
 10011 DIRECTOR, FOOD AND BEVERAGE  
 10032 MANAGER, MERCHANDISE  
 10035 MANAGER, STORE  
 10046 MANAGER, AUTOMOBILE  
 10047 MANAGER, AUTOMOTIVE PARTS DEPART  
 10048 MANAGER, WHOLESALER  
 10049 MANAGER, RESTAURANT, COFFEE SHOP, LIO  
 10051 PRINCIPAL  
 10052 ASSISTANT PRINCIPAL  
 10053 SUPERINTENDENT  
 10057 CHIEF EXECUTIVE, LEGISLATURE  
 19000 ALL OTHER MANAGERS

## 20 PROFESSIONAL OCCUPATIONS

21000 ENGINEERS  
 21003 CHEMICAL ENGINEER  
 21004 CIVIL ENGINEER  
 21005 ELECTRICAL AND ELECTRONIC ENGINEERS  
 21006 INDUSTRIAL ENGINEER  
 21008 MECHANICAL ENGINEER  
 21009 METALLURGISTS, ENGINEERS  
 21010 MINING ENGINEER  
 21011 PETROLEUM ENGINEER  
 21012 SAFETY ENGINEER  
 21013 TRAFFIC ENGINEER  
 21017 NUCLEAR ENGINEER  
 21900 ALL OTHER ENGINEERS  
 22000 NATURAL & MATHEMATICAL SCIENTISTS  
 22100 MATHEMATICAL SCIENTISTS  
 22102 FINANCIAL ANALYST  
 22104 STATISTICIAN  
 22199 ALL OTHER MATHEMATICAL SCIENTISTS  
 22200 PHYSICAL SCIENTISTS  
 22201 CHEMIST  
 22202 GEOLOGISTS AND GEOPHYSICISTS  
 22239 ALL OTHER PHYSICAL SCIENTISTS  
 22300 LIFE SCIENTIST  
 22301 AGRICULTURAL SCIENTIST  
 22302 BIOLOGICAL SCIENTIST  
 22308 FORESTER AND CONSERVATION SCIENTIST  
 22339 ALL OTHER LIFE SCIENTISTS  
 23002 ECONOMIST  
 23003 MARKET-RESEARCH ANALYST  
 23004 PSYCHOLOGIST  
 23005 SOCIOLOGIST  
 23006 URBAN AND REGIONAL PLANNER  
 23900 ALL OTHER SOCIAL SCIENTISTS  
 24000 SYSTEMS ANALYST, E D P  
 24001 SYSTEMS ANALYST, BUSINESS  
 24002 SYSTEMS ANALYST, SCIENTIFIC & TECH  
 25101 TEACHER, PRESCHOOL OR KINDERGARTEN  
 25103 TEACHER, SECONDARY SCHOOL  
 25104 TEACHER, JUNIOR COLLEGE  
 25105 TEACHER, VOC EDUCATION OR TRAINING  
 25106 TEACHER, NONVOCATIONAL EDUCATION  
 25107 VOCATIONAL & EDUCATIONAL COUNSELOR  
 25108 GRADUATE ASSISTANT  
 25109 PROFESSOR  
 25110 ASSOCIATE PROFESSOR  
 25111 ASSISTANT PROFESSOR  
 25112 LECTURER  
 25114 ATHLETIC COACH  
 25115 TEACHER, ELEMENTARY OR PRE-SCHOOL  
 25199 ALL OTHER TEACHERS  
 25200 PHOTOGRAPHER

25201 PHOTOGRAPHER, PORTRAIT OR COMMERCIAL  
 25205 TELEVISION CAMERA OPERATOR  
 25300 PURCHASING AGENT AND/OR BUYER  
 25301 BUYER, RETAIL AND/OR WHOLESALE TRADE  
 25401 ACCOUNTANTS AND AUDITORS  
 25403 LANDSCAPE ARCHITECT  
 25404 APPRAISER  
 25405 ARCHITECT  
 25409 ANNOUNCER, RADIO AND TELEVISION  
 25412 BROADCAST NEWS ANALYST  
 25413 BUDGET ANALYST  
 25414 MEDIA BUYER  
 25416 DIRECTOR, CAMP  
 25418 CASEWORKER  
 25419 CHIROPRACTOR  
 25423 CLERGY  
 25426 COMMERCIAL ARTIST  
 25427 COST ESTIMATOR, ENGINEERING  
 25428 CREDIT ANALYST, CHIEF  
 25429 CREDIT ANALYST  
 25433 DENTIST  
 25434 DIETITION AND/OR NUTRITIONIST  
 25436 WRITER AND/OR EDITOR  
 25437 EMBALMER  
 25442 INVESTIGATOR, INSURANCE  
 25443 EMPLOYMENT INTERVIEWER  
 25445 LAW CLERK  
 25446 LAWYER  
 25447 LEASE BUYER  
 25448 LIBRARIAN, PROFESSIONAL  
 25450 MEDIA ANALYST  
 25456 MUSICIAN, INSTRUMENTAL  
 25457 NURSE, PROFESSIONAL  
 25458 OCCUPATIONAL THERAPIST  
 25459 OPTOMETRIST  
 25462 PARALEGAL PERSONNEL  
 25465 PERSONNEL AND LABOR RELATIONS SPEC  
 25466 PHARMACIST  
 25468 PHYSICAL THERAPIST  
 25469 PHYSICIAN AND/OR SURGEON  
 25470 PODIATRIST  
 25472 PUBLIC RELATIONS PRACTITIONER  
 25476 REPORTERS AND CORRESPONDENTS  
 25477 RIGHT-OF-WAY AGENT  
 25479 SPORTS INSTRUCTOR  
 25483 TECHNICAL DIRECTOR  
 25484 TITLE CLERK  
 25485 TITLE EXAMINER AND/OR ABTRACTOR  
 25488 VETERINARIAN  
 25489 DESIGNER  
 25496 ATHLETIC TRAINER  
 25501 COMMUNITY ORGANIZATION WORKER  
 25503 WELFARE INVESTIGATOR  
 25504 JUDGE  
 25505 MAGISTRATE  
 25507 TAX EXAMINER, COLLECTOR-REVENUE AGT  
 25517 ASSESSOR  
 25522 ALL OTHER THERAPISTS  
 25527 APPRAISER, REAL ESTATE  
 25530 SPECIAL AGENT, INSURANCE  
 25531 TRAVEL AGENT-ACCOMMODATIONS TRPSSR  
 25532 HOME ECONOMIST  
 25533 CLAIM EXAM, PROPERTY/CASUALTY INS  
 25534 TAX PREPARER  
 25535 GROUP RECREATION WORKER  
 25537 MANUAL ARTS, MUSIC, RECREAT THERAPIST  
 25538 SPEECH PATHOLOGIST/AUDIOLOGIST  
 25540 ESTIMATOR, PRINTING SERVICES  
 25541 CORRECTIVE THERAPIST  
 25542 RESPIRATORY THERAPIST  
 25544 AUDIO-VISUAL SPECIALIST  
 25546 CURRICULUM SPECIALIST  
 25548 UNDERWRITER  
 27000 ALL OTHER PROFESSIONAL WORKERS

## 30 TECHNICAL OCCUPATIONS

31000 COMPUTER PROGRAMMER  
 31001 COMPUTER PROGRAMMER, BUSINESS  
 31002 COMPUTER PROG-SCIENTIFIC/TECHNICAL  
 32000 ENGINEERING TECHNICIANS  
 32001 COMPUTER, PROSPECTING-SEISMOGRAPH  
 32002 CORE ANALYST  
 32003 DRAFTER  
 32004 ELECTRICAL-ELECTRONIC TECHNICIANS  
 32005 OBSERVER, ELECTRICAL-GRAVITY PRSPCTG  
 32007 SCOUT  
 32008 SURVEYOR  
 32010 MECHANICAL ENGINEERING TECHNICIAN  
 32011 TOOL PROGRAMMER, NUMERICAL CONTROL  
 32012 TRAFFIC TECHNICIAN  
 32014 SPECIFICATION WRITER, ENGINEERING  
 32017 BROADCAST TECHNICIAN  
 32019 INDUSTRIAL ENGINEERING TECHNICIAN  
 32020 CIVIL ENGINEERING TECHNICIAN  
 32021 ESTIMATOR AND DRAFTER, UTILITIES  
 32900 ALL OTHER ENGINEERING TECHNICIANS  
 33000 SCIENCE TECHNICIANS  
 33001 PHYSICAL SCIENCE TECHNICIAN  
 33002 BIOLOGICAL SCIENCE TECHNICIAN  
 33005 TIMBER CRUISER  
 33900 ALL OTHER SCIENCE TECHNICIANS  
 34003 DENTAL ASSISTANT  
 34013 LICENSED PRACTICAL NURSE  
 34016 PHYSICIAN'S ASSISTANT  
 34023 AIRPLANE PILOT  
 34029 TECHNICAL ASSISTANT, LIBRARY  
 34034 SURGICAL TECHNICIAN  
 34035 TAXIDERMIST  
 34036 RADIOLOGIC TECHNICIAN  
 34047 PHARMACY HELPER  
 34048 MEDICAL-RECORD LIBRARIAN  
 35000 MEDICAL-DENTAL TECHNICIANS-TECHNO  
 35001 DENTAL HYGIENIST  
 35002 MEDICAL LABORATORY TECHNOLOGIST  
 35003 BIOCHEMISTRY TECHNOLOGIST  
 35004 MICROBIOLOGY TECHNOLOGIST  
 35005 CYTOTECHNOLOGIST  
 35006 HISTOLOGIC TECHNOLOGIST  
 35010 MEDICAL LABORATORY TECHNICIAN  
 35011 ELECTROCARDIOGRAPH TECHNICIAN  
 35012 ELECTROENCEPHALOGRAPH TECHNICIAN  
 35013 EMERGENCY MEDICAL TECHNICIAN  
 35014 DIETETIC TECHNICIAN  
 35015 BLOOD BANK TECHNOLOGY SPECIALIST  
 35016 PHYSICAL THERAPY ASSISTANT  
 35018 RADIOLOGIC/NUCLEAR MEDICAL TECH  
 35900 ALL OTHER MEDICAL-DENTAL TECH  
 39000 ALL OTHER TECHNICIANS

## 40 SERVICE OCCUPATIONS

41000 JANITORS, PORTERS, AND CLEANERS  
 41001 CLEANER, HEAVY  
 41002 CLEANER, LIGHT  
 41003 MAID  
 41004 WINDOW WASHER  
 41005 HOUSE CLEANER  
 41900 ALL OTHER JANITORS, PORTERS, CLEANERS  
 42000 GUARDS AND DOORKEEPERS  
 42009 FOOD SERVICE WORKERS  
 43001 BAKER, BREAD AND/OR PASTRY  
 43002 BARTENDER  
 43003 DINING ROOM/BAR HELPER/CAFE ATTEND  
 43004 BUTCHER AND/OR MEAT CUTTER  
 43006 HOSTESS/HOST, REST-LNGE-COFFEE SHOP  
 43007 KITCHEN HELPER  
 43009 WAITER OR WAITRESS  
 43010 COUNTER ATTENDANT, LUNCH COFFEE-REST  
 43011 COOK, SHORT ORDER/SPLTY FAST-FOOD  
 43013 COOK, RESTAURANT  
 43014 FOOD PREP/SERVICE WKR, FAST FOOD RST

43015 PANTRY, SANDWICH AND/OR COFFEE MAKER  
 43016 COOK, INSTITUTION  
 43900 ALL OTHER FOOD SERVICE WORKERS  
 44001 CHILD CARE ATTENDANT  
 44002 BARBER  
 44003 BELLHOP, BAGGAGE PORTER, DOORKEEPER  
 44006 COSMETOLOGIST AND/OR HAIRSTYLIST  
 44010 DETECTIVE  
 44014 SUPERVISOR, NONWORKING-SERVICE ONLY  
 44015 FUNERAL ATTENDANT  
 44017 GUIDE, TRAVEL  
 44019 HOUSEKEEPER  
 44023 MANICURIST  
 44024 MASSEUR OR MASSEUSE  
 44025 NURSE AIDE AND/OR ORDERLY  
 44028 PSYCHIATRIC AID  
 44029 RECREATION FACILITY ATTENDANT  
 44031 GAME-RIDE OPERATORS & CONCESSION  
 44032 SCALP TREATMENT OPERATOR  
 44034 USHER, LOBBY/DRIVE-IN THEATER ATTEND  
 44037 BOOTBLACK  
 44038 SHAMPOOER  
 44040 INSTRUCTOR, REDUCING  
 44043 ORTHOPEDIC-CAST SPECIALIST  
 44059 FOREST CONSERVATION WORKER  
 44062 SCHOOL CROSSING GUARD  
 44073 STORE DETECTIVE  
 44075 GUIDE, SIGHTSEEING OR ESTABLISHMENT  
 44076 ELEVATOR OPERATOR  
 44077 CHILD-CARE WORKER  
 44078 LIFEGUARD  
 44079 CHECKROOM AND LOCKER ROOM ATTENDANT  
 44080 SOCIAL SERVICE AIDE  
 44081 MEDICAL ASSISTANT  
 44082 OCCUPATIONAL THERAPY ASSISTANT  
 44085 SCHOOL MONITOR  
 44086 MORTUARY BEAUTICIAN  
 44501 OFFICER, POLICE  
 44502 DETECTIVE, POLICE  
 44503 POLICE PATROL OFFICER  
 44504 PARKING ENFORCEMENT OFFICER  
 44505 CORRECTION OFFICER AND/OR JAILER  
 44506 SHERIFF  
 44507 BAILIFF  
 44551 FIRE INSPECTOR  
 44552 FIRE FIGHTER  
 44553 FIRE FIGHTING SUPERVISOR  
 49000 ALL OTHER SERVICE WORKERS

## 50 CONSTRUCTION REPAIR &amp; MATL HANDLING

51002 MECHANIC, AIRCRAFT  
 51008 MECHANIC, AUTOMOTIVE  
 51012 BODY REPAIRER, AUTOMOTIVE  
 51016 BICYCLE REPAIRER  
 51017 CAMERA AND/OR MOTION PICTURE REPAIR  
 51019 DIESEL MECHANIC  
 51020 ELECTRIC-MOTOR REPAIRER  
 51021 ELECTRIC-TOOL REPAIRER  
 51024 ELECTROMEDICAL EQUIPMENT REPAIRER  
 51025 FARM EQUIPMENT MECHANIC  
 51027 ELECTRIC-METER INSTALLER/CUT-IN/OUT  
 51030 GAS METER INSTALLER  
 51032 GUNSMITH  
 51034 ENGINEERING-EQUIPMENT MECHANIC  
 51035 HYDROELECTRIC-MACHINERY MECHANIC  
 51039 LAUNDRY-MACHINE MECHANIC  
 51040 LOCKSMITH  
 51041 MINE-MACHINERY MECHANIC  
 51042 MARINE MECHANIC AND/OR REPAIRER  
 51047 MECHANIC, MAINTENANCE  
 51044 PINSETTER MECHANIC, AUTOMATIC  
 51046 OFFICE MACHINE/CASH REGISTER SERV  
 51049 POWER-TRANSFORMER REPAIRER  
 51051 RADIO MECHANIC  
 51052 REFRIGERATION/AIR CONDITIONING MECH  
 51053 TELEVISION, RADIO/TAPE RECORDER REP

51056	COIN-MACHINE/VENDING SERVICER/REP	55819	FILE/GRIND/BUFF/CHIP/CLEAN-POLISHER
51057	MOTORBOAT MECHANIC	55022	FINE GRADER
51058	TREATMENT-PLANT, MECHANIC	55823	FIRE BOSS
51059	HOUSEHOLD-APPLIANCE REPAIR-SERVICER	55826	FITTER, PIPELAYING
51077	ELECTRONIC MECHANIC	55829	SUPERVISOR, NONWORKING
51078	WATER METER INSTALLER	55830	FOLDFR, LAUNDRY
51080	GAS AND ELECTRIC APPLIANCE REPAIRER	55831	FORM SETTER, METAL ROAD-FORM
51900	ALL OTHER MECHANICS AND REPAIRERS	55832	FORM TAMPER AND/OR TAMPING MACH OPR
52002	DEVELOPER AND/OR PROJECTION PRINTER	55834	FORMATION TESTING OPERATOR
52005	MULTIPLE-PHOTOGRAPHIC-PRINTER OPR	55837	FURNACE INSTALLER&REPAIRER, HOT AIR
52007	PHOTO CHECKER AND ASSEMBLER	55839	GAGER
52009	COPY CAMERA OPERATOR	55841	GAS-COMPRESSOR OPERATOR
53001	MARKER, CLASSIFIER, WET WASH ASSMBLR	55842	DISPATCHER, GAS
53002	SPOTTER, DRY CLEANING	55844	GEAR CUT, GRIND, SHAPING MACH OPR
53003	SPOTTER, WASHABLE MATERIALS	55845	NATURAL-GAS-TREATING-UNIT OPERATOR
53004	WASHER, MACHINE AND/OR STARCHER	55848	GLAZIER
53005	TUMBLER OPERATOR	55849	GROUND WORKER, UTILITIES
53006	DRY-CLEANING MACHINE OPERATOR	55852	HEAVY EQUIPMENT OPERATOR
53008	DRY CLEANER, HAND	55854	RIGGER
53011	LAUNDRY OPR, SMALL ESTABLISHMENT	55855	HYDRAULIC OPERATOR
53014	PRESSER, HAND	55857	INDUSTRIAL TRUCK OPERATOR
53015	PRESSER, MACHINE	55858	INSPECTOR
53016	LAUNDRY PRESSER, MACHINE	55859	INSTALLER REPAIR/SECTION MAINTAINER
53021	RUG CLEANER, HAND	55862	INSTRUMENT REPAIRER
53022	RUG CLEANER, MACHINE	55866	JEWELER AND/OR SILVERSMITH
53030	SHOE REPAIRER	55867	LAMINATING-MACHINE OPR, FURNITURE
54000	TRUCK DRIVER	55868	LAMP KEEPER AND/OR REPAIRER
54001	TRUCK DRIVER, HEAVY	55869	LATHER
54002	TRUCK DRIVER, LIGHT	55873	LINE INSTALLER-REPAIRER
54003	TRACTOR-TRAILER TRUCK DRIVER	55875	LOADER, TANK CARS AND/OR TRUCKS
55404	AIR-HAMMER OPERATOR	55877	LIOUEFICATION&REGASIFICATION PL OPR
55A08	ASBESTOS AND INSTALLATION WORKERS	55878	LOADING-MACHINE OPR, UNDERGROUND
55A09	ASPHALT-HEATER TENDER	55880	LONG-WALL MINER OPERATOR
55A12	AUGER-MACHINE OPERATOR	55884	MACHINIST
55A13	AUTOMOBILE REPAIR-SERVICE ESTIMATOR	55885	MATTRESS MAKER
55A16	BAGGAGE HANDLER	55896	MAINTENANCE REPAIRER, GEN UTILITY
55A21	BLASTER, MINING AND QUARRING	55887	HELPER, TRADES
55A22	BLASTER, CONSTRUCTION	55889	MARINE-SERVICE-STATION-ATTENDANT
55A24	BOILERMAKER	55891	METAL FABRICATOR
55A26	HEADER, BOTTOMER, CAR DROPPER & CAGER	55893	MIXER
55A29	BRAKER, TRAIN	55895	MILLWRIGHT
55A30	BRAITICE BUILDER	55896	MENOR
55A31	BRICKLAYER	55898	DINKEY OPERATOR
55A33	BLUEPRINTING MACHINE OPERATOR	55C02	MUD-PLANT OPERATOR
55A36	BUS DRIVER	55C05	OIL PUMPER
55A38	CABINETMAKER	55C06	OILER
55A43	CABLE SPLICER	55C07	MUSICAL INSTRUMENT REPAIRER
55A44	CARPET CUTTER AND/OR CARPET LAYER	55C09	ORDER FILLER
55A47	CARPENTER	55C09	PHOTOGRAPH RETOUCHER, AIRBRUSH ART
55A48	CASER	55C11	PAINTER, AUTOMOTIVE
55A51	CEMENT MASON	55C12	PAINTER, MAINTENANCE
55A55	CENTRAL OFFICE REPAIRER	55C16	PAPERHANGER
55A60	CLEAN-OUT DRILLER	55C17	PARKING-LOT ATTENDANT
55A61	CLEANER, VEHICLE	55C20	PANELBOARD & GRINDING MILL OPERATOR
55A67	CONCRETE-MIXER OPERATOR	55C21	PIPE-CLEANING & PRIMING MACHINE OPR
55A68	CONCRETE-WALL GRINDER OPERATOR	55C23	PIPELAYER
55A69	CONCRETE RUBBER	55C24	PIPE STRIPPER
55A74	CONTINUOUS-MINING-MACHINE OPERATOR	55C28	PLASTERER
55A75	CONTROL ROOM OPERATOR, STEAM	55C29	ELECTROPLATER
55A79	COOK AND/OR COOKER	55C30	PLUMBER AND/OR PIPEFITTER
55A90	CORROSION CONTROL FITTER	55C34	POWER REACTOR OPERATOR
55A82	CRANE, DERRICK, AND HOIST OPERATORS	55C36	PRESS OPERATOR AND/OR PLATE PRINTER
55A87	DELIVERY AND/OR ROUTE WORKERS	55C39	PRODUCTION PACKAGER, HAND OR MACHINE
55A99	DERRICK OPR, PETROL & GAS EXTRACTION	55C40	MOVION PICTURE PROJECTIONIST
55A30	DISPATCHER, MINE CAR	55C42	STATION ENGINEER, MAIN LINE
55A93	MERCHANDISE DISPLAYER & WINDOW TRIM	55C43	PUMPER, HEAD
55A98	DREDGE OPERATOR	55C47	ROCK SPLITTER, QUARRY
55B02	DRIER OPERATOR, COAL OR ORE	55C50	REAGENT TENDER
55B03	DRILLER, HAND	55C51	REFUSE COLLECTOR
55B04	DRILLER, MACHINE	55C52	REINFORCING-IRON WORKER
55B05	DRY-WALL APPLICATOR	55C56	ROCK-DUST SPRAYER
55B07	DUMP OPERATOR	55C57	ROOF ROLTER
55B12	ELECTRICIAN	55C58	ROOFER
55B15	AUXILIARY EQUIPMENT OPERATOR	55C59	ROTARY DRILL OPERATOR
55B17	EXTERMINATOR	55C60	ROTARY-DRILL OPERATOR HELPER
55B18	FENCE ERECTOR	55C51	ROUSTABOUT

55C62 DENTAL-LABORATORY TECHNICIAN  
 55C64 SANDBLASTER AND/OR SHOTBLASTER  
 55C65 CUSTOM SEWER  
 55C69 SERVICE UNIT OPERATOR, OIL WELL  
 55C71 SEWAGE-PLANT OPERATOR  
 55C76 SEWING MACH OPR, REG EQUIP-GARMENT  
 55C77 SEW-MACH OPR, SPEC & AUTO EQUIP-GRMT  
 55C78 SEW-MACH OPR, REG EQUIP-MONGARMENT  
 55C79 SEW-MACH OPR, SPEC&AUTO EQUIP NONGMT  
 55C80 SHAKER TENDER  
 55C81 SHEET METAL WORKER  
 55C83 SHUTTLE CAR OPERATOR  
 55C85 SIGN ERECTOR  
 55C89 STATION INSTALLER  
 55C90 STATIONARY BOILER FIRER  
 55C91 STATIONARY ENGINEER  
 55C92 STONE MASON  
 55C94 STREET-LIGHT REPAIRER AND SERVICER  
 55C95 LAYOUT WORKER, STRUCTURAL STEEL  
 55C96 STRUCTURAL-STEEL WORKER  
 55001 SUBSTATION OPERATOR  
 55003 SWITCHBOARD OPR, GENERATING PLANT  
 55005 ALTERATION TAILOR  
 55007 TAPER  
 55009 TAXI DRIVER  
 55014 ANIMAL CARETAKER  
 55018 TROUBLE LOCATOR, TEST DESK  
 55019 TILE SETTER  
 55021 TIPPLE-OPERATOR  
 55022 TIRE FABRICATOR AND/OR REPAIRER  
 55023 TOOL AND DIE MAKER  
 55025 TRACK LAYER  
 55027 LOGGING TRACTOR OPERATOR  
 55028 TRAILER AND/OR VAN RENTAL ATTENDANT  
 55031 TROUBLE SHOOTER, POWER LINE  
 55033 TURBINE OPERATOR  
 55035 WATCHMAKER  
 55042 WATERSHED TENDER  
 55043 WATER TREATMENT PLANT OPERATOR  
 55044 PUMP STATION OPERATOR, WATERWORKS  
 55046 WELDERS AND FLAMECUTTERS  
 55047 WELL PULLER  
 55054 FURNITURE ASSEMBLER AND INSTALLER  
 55056 OFFST LITHO OPR, SHEET, ROLL, WEB FED  
 55057 PLATEMAKER  
 55058 STRIPPER  
 55059 CAMERA OPERATOR, PRINTING  
 55061 PHOTO LETTERING MACHINE OPERATOR  
 55064 PIN CHASER  
 55066 BAGGER  
 55067 FUEL PUMP ATTENDANT & LUBRICATOR  
 55069 FIRE CHANGER  
 55069 OPTICIAN, DISPENSING & OPTICAL MECH  
 55072 DRAPERY HANGER  
 55073 HOUSEHOLD-APPLIANCE-INSTALLER  
 55074 STOCK CLERK, SALES FLOOR  
 55075 HIGHWAY-MAINTENANCE MAN  
 55086 FURNITURE FINISHER  
 55087 FURNITURE UPHOLSTERER  
 55088 SURVEYOR HELPER  
 55090 BOAT PATCHER, PLASTIC  
 55094 TRIMMER, MACHINE  
 55095 DISPATCHER, LOAD  
 55096 SEPTIC TANK SEW/SEWER PIPE CLEANER  
 55E13 ALL-AROUND TAILOR  
 55E18 ASPHALT-MIXING-MACHINE TENDER  
 55E20 ASPHALT-PLANT OPERATOR  
 55E25 BAKER  
 55E28 POWER-BARKER OPERATOR  
 55E69 BENCH HAND, JEWELRY  
 55E86 BLOCKMAKING-MACHINE OPERATOR  
 55E95 BONER, MEAT  
 55E96 BONER, POULTRY  
 55F34 BUTCHER, ALL-AROUND  
 55F35 BUTTERMAKER  
 55F37 CAGE MAKER, HAND OR MACHINE  
 55F38 CAKE DECORATOR  
 55F48 CANDY MAKER  
 55F56 CARBONATION EQUIPMENT TENDER, BEER  
 55F58 CARCASS SPLITTER  
 55F70 CASING FINISHER AND/OR STUFFER  
 55F75 CASTER  
 55F97 CHAIN OFFBEARER, LUMBER  
 55G07 CHEESEMAKER  
 55G14 CHEMICAL OPERATOR A  
 55G15 CHEMICAL OPERATOR B  
 55G17 CHEMICAL OPERATOR HELPER  
 55G20 CHIPPER  
 55G22 CHOKER SETTER, LUMBER  
 55G31 AUTOMATIC CLIPPER, VENEER  
 55G58 COMPOUNDER  
 55G63 CONCRETE-PIPE MAKER  
 55G64 CONCRETE-STONE FABRICATOR  
 55G65 CONCRETE-STONE FINISHER  
 55G68 CONTROL PANEL OPERATOR, PETROLEUM  
 55G78 COOLER ROOM WORKER, MEAT  
 55G85 COREMAKER, HAND, BENCH, AND/OR FLOOR  
 55G86 COREMAKER, MACHINE  
 55H13 CUT-OFF-SAW OPERATOR, LUMBER  
 55H25 CUTTER, PORTABLE MACHINE  
 55H35 DAIRY PROCESSING EQUIPMENT OPERATOR  
 55H47 DECORATOR, BAKERY PRODUCTS  
 55H64 DIE CUTTER AND/OR CLICKING MACH OPR  
 55H82 DOUGHNUT MAKER/DOUGHNUT MACH OPR  
 55H95 DRILL-PRESS/BORING-MACHINE OPERATOR  
 55I18 EDGER, AUTOMATIC AND/OR PONY  
 55I35 ETCHER AND/OR ENGRAVER  
 55I50 FABRICATOR, PLASTICS  
 55I51 FALLER AND/OR BUCKER  
 55I53 FEED PELLET MILL OPERATOR  
 55I71 FINISHER, POTTERY & PORCELAIN  
 55I94 FORGING PRESS OPERATOR  
 55J22 GANG SAWYER  
 55J28 GEM CUTTER  
 55J34 GLASS-CUT-OFF/CUTTING MACH OPERATOR  
 55J63 GRINDING/ABRADING MACH OPR, METAL  
 55J93 HEAD SAWYER  
 55J95 HEAT TREATER/ANNEALER/TEMPERER  
 55K17 INGREDIENT SCALER  
 55K41 KILN OPERATOR  
 55K46 KNITTING-MACHINE OPERATOR  
 55K58 LATHE/TURNING MACHINE OPR, METAL  
 55K61 LAY-OUT MARKER, METAL  
 55K74 LIMER  
 55K79 TANNING-LIQUOR MAKER  
 55K80 LOADER, CAR AND TRUCK  
 55K81 LOADER ENGINEER  
 55K84 LOG HANDLING EQUIPMENT OPERATOR  
 55K85 LOG INSPECTORS, GRADERS/SCALERS  
 55K89 LUGGAGE MAKER  
 55K90 LUMBER GRADER  
 55K91 LUMBER STRAIGHTENER  
 55K97 MACHINE SETTER, WOODWORKING  
 55K99 MACHINE SETTER, PAPER GOODS  
 55L01 MACHINE TOOL OPERATOR, COMBINATION  
 55L02 MACH TOOL OPR, NUMERICAL CONTROL  
 55L03 MACHINE TOOL OPERATOR, TOOLROOM  
 55L04 MACHINE TOOL SETTER, METALWORKING  
 55L15 MEASURING-MACHINE OPERATOR, LEATHER  
 55L16 MEAT GRINDER  
 55L31 MILLING AND/OR PLANING MACHINE OPR  
 55L34 WOOD MACHINIST  
 55L57 HOLDER, BENCH AND/OR FLOOR  
 55L61 MOLDER, MACHINE  
 55L71 NAILING-MACHINE OPERATOR  
 55L84 OFF-BEARER  
 55M10 PATTERNMAKER, WOOD  
 55M29 PLASTIC-TOP INSTALLER  
 55M32 PLATER HELPER  
 55M41 POND WORKER, LUMBER  
 55M51 POWER-PRESS TENDER  
 55M57 RESAWYER  
 55M58 RETORT OPERATOR  
 55M65 RIPS AW OPERATOR



55N51 SAMPLE MAKER  
 55N60 SANDER, WOOD  
 55N63 SAW, FILER  
 55N64 SAWYER, METAL  
 55P01 SHOE PARTS SEWER, HAND  
 55P03 SHAKEOUT WORKER, FOUNDRY  
 55P38 SKINNER, ANIMAL  
 55P49 SLITTING MACHINE OPERATOR  
 55P73 SPINNER, CONFECTION  
 55P74 SPINNER, FRAME  
 55P78 SPLITTING-MACHINE FEEDER  
 55P91 STAKER, MACHINE  
 55Q19 STONE CARVER, HAND  
 55Q26 STONE SETTER  
 55O50 TANNING DRUM OPR&COLORER,HIDE-SKINS  
 55O51 TAPING-MACHINE OPERATOR  
 55Q57 TESTER  
 55Q93 TREATING ENGINEER  
 55O88 TRIM SAW OPERATOR  
 55R04 UPHOLSTERY TRIMMER  
 55R08 VARIETY SAW OPERATOR  
 55R30 WAX PATTERN WORKER  
 55R43 WOODWORKING-MACHINE OPERATOR  
 55R48 WRAPPING-MACHINE OPERATOR  
 55P49 WRINGER-MACHINE OPERATOR  
 55R62 SEPARATOR TENDER  
 55R67 ASPHALT RAKER  
 55R68 PAINTER, PRODUCTION  
 55R73 DIE-CAST MACH OPR,MTL&DIE-CAST SETR  
 55R74 WIRER, ELECTRONIC  
 55R75 IMPREGNATOR, ELECTRONIC  
 55R76 RIVETER, HEAVY  
 55R78 PUNCH-PRESS OPERATOR, METAL  
 55R79 PUNCH-PRESS SETTER, METAL  
 55R80 SHEAR AND/OR SLITTER OPERATOR,METAL  
 55R81 SHEAR AND/OR SLITTER SETTER  
 55R82 COIL WINDER  
 55R84 ENCAPSULATOR  
 55R85 COMPRESS/INJECT-MOLD-MACH OPR,PLSTC  
 55R90 CONVEYOR OPERATOR OR TENDER  
 55S04 MIXER,STONE,CLAY,GLASS&RELATED PROD  
 55S06 CEILING-TILE INSTALLER/FLOOR LAYFR  
 55S15 DIP PLATER, NON-ELECTROLYTIC  
 55S16 FURNACE OPERATOR/CUPOLA TENDER  
 55S22 CUTTING MACHINE OPERATOR, FOOD  
 55S23 FARM EQUIPMENT OPERATOR  
 55S24 ENROBING-MACHINE OPR/MACHINE ICER  
 55S28 SETTER, PLASTIC MOLDING MACHINE  
 55S31 FITTER, STRUCTURAL METAL  
 55S36 UPHOLSTERER  
 55S37 UPHOLSTERY CUTTER  
 55S42 CONCRETE-Vault MAKER  
 55S47 CANNERY WORKER  
 55S53 CHIEF OPERATOR  
 55S67 SPLITTER, MACHINE  
 55S78 CUTTER, HAND  
 55S79 TERRAZZO WORKER  
 55S84 AUTO SEAT CVR,CONV/VINYL TOP INSTLR  
 55S90 POWER BRAKE/BENDING MACH OPR, METAL  
 55S92 PLATER OPERATOR  
 55S96 GLASS INSTALLER, AUTOMOTIVE  
 55S98 MILL AND/OR GRINDER OPR, MINERALS  
 55T01 COPY MARKER  
 55T03 HAND COMPOSITOR  
 55T04 IMPOSER AND MAKEUP ARRANGER  
 55T05 LINE CASTING MACHINE OPERATOR  
 55T06 LINECASTING-MACHINE KEYBOARD OPR  
 55T07 LINECASTING-MACHINE TENDER  
 55T09 MONOTYPE-CASTING-MACHINE OPERATOR  
 55T11 PASTEUR MAN/WOMAN  
 55T12 PHOTOTYPESETTING-MACH-KEYBOARD OPR  
 55T13 PHOTOTYPESETTING-MACHINE MONITOR  
 55T14 PHOTOTYPESETTER OPERATOR  
 55T15 PROOFREADER, COMPOSED COPY  
 55T19 PHOTOENGRAVER  
 55T23 LETTER PRESS OPR,SHEET,ROLL,WEB FED  
 55T24 LETTERSET PRESS OPR,SHEET,ROLL,WEB  
 55T27 PRESS ASSISTANTS AND FEEDERS  
 55T28 SETTER, BINDERY MACHINES  
 55T31 MAILER  
 55T32 TRUCK DRIVER HELPER  
 55T33 LINE-SERVICE ATTENDANT  
 55T35 MOBILE HOME REPAIRER  
 55T38 MOBILE HOME SET-UP OPERATOR  
 55T39 PICTURE FRAMER  
 55T42 LOCKER-PLANT ATTENDANT  
 55T43 WEIGHER, PRODUCTION  
 55T44 FOOD SHAPER, HAND  
 55T47 GARDENERS AND GROUNDSKEEPERS  
 55T48 CHAUFFEUR  
 55T57 DEPOSITOR, FOOD  
 55T60 WASHER AND/OR SEPARATOR, FOOD  
 55T51 GRADER, FOOD AND/OR SKINS  
 55T62 EQUIPMENT CLEANER, HAND  
 55T66 CUTTER, MACHINE  
 55T70 SCREEN OR STENCIL PRINTER/SETTER  
 55T80 BOOKBINDER, HAND  
 55T81 BOOKBINDER, MACHINE  
 55T82 BINDERY WORKER, ASSEMBLY  
 55T83 BINDERY WORKER, STITCHING  
 55T84 ALL OTHER BINDERY WORKERS  
 55T85 CUSHION MAKER  
 55T90 CALENDER OPERATOR, PLASTICS/RUBBER  
 55T91 EXTRUDER OPERATOR, PLASTICS/RUBBER  
 55T97 PUMP OPERATOR  
 55T99 SAND CUTTER, MIXER AND/OR SLINGER  
 55U00 ASSEMBLER  
 55U01 MACHINE ASSEMBLER  
 55U02 INSTRUMENT MAKER/ASSEMBLER  
 55U03 ELECTRIC/MECHANICAL FLUID ASSEMBLER  
 55U04 ELECTRIC/ELECTRONIC ASSEMBLER  
 55U09 ALL OTHER ASSEMBLERS  
 55V05 BUS DRIVER, SCHOOL  
 55V06 AMBULANCE DRIVER AND/OR ATTENDANT  
 55V07 TREE TRIMMER  
 55V09 REFRAMER, HAND OR MACHINE  
 55V10 MOLD AND/OR MOLD MAKER  
 56001 ASBESTOS AND INSULATION WORKER H.P.R.  
 56002 BRICKLAYER HELPER  
 56003 CARPENTER HELPER  
 56004 CEMENT MASON HELPER  
 56005 ELECTRICIAN HELPER  
 56006 PAINTER HELPER  
 56009 PLASTERER HELPER  
 56010 PLUMBER AND/OR PIPEFITTER HELPER  
 56011 ROOFER HELPER  
 56013 TILE SETTER HELPER  
 56016 TERRAZZO WORKER HELPER  
 56900 ALL OTHER HELPERS, SKILLED TRADES  
 57004 BATCH PLANT OPERATOR  
 57021 MILLER, CLAY  
 57031 MIXER/BLENDER, CHEMCLS/CHEMCL PROD  
 58009 LAMINATOR, PREFORMS  
 58014 VACUUM PLASTIC FORMING MACHINE OPR  
 59001 ALL OTHER SKILLED CRAFT/RELATED WKR  
 59002 ALL OTHER OPERATIVES&SEMISKILLED WKR  
 59003 ALL OTHER LABORERS&UNSKILLED WKR  
 60 CLERICAL OCCUPATIONS  
 61103 BOOKKEEPING/BILLING MACHINE OPR  
 61105 COMPUTER OPERATOR  
 61107 KEYPUNCH OPERATOR  
 61107 PERIPHERAL EDP EQUIPMENT OPERATOR  
 61112 PROOF MACHINE OPERATOR  
 61119 CALCULATING MACHINE OPERATOR  
 61120 DUPLICATING MACHINE OPERATOR  
 61121 COIN MACH OPERATOR/CURRENCY SCRIBER  
 61199 ALL OTHER OFFICE MACHINE OPERATORS

61200 STENOGRAPHER  
 61301 ACCOUNTING CLERK  
 61307 BOOKKEEPER, HAND  
 61308 BROKERAGE CLERK  
 61309 CALL-OUT OPERATOR  
 61310 CANCELLATION CLERK  
 61312 CAR RENTAL CLERK  
 61313 ADJUSTMENT CLERK  
 61314 CASHIER  
 61315 CHECKING CLERK, BANK RECORDS  
 61316 CLAIM ADJUSTER  
 61318 CLAIMS CLERK  
 61319 COLLECTOR  
 61321 FILM BOOKER  
 61323 CORRESPONDENCE CLERK  
 61324 COUNTER CLERK  
 61325 DESK CLERK, BOWLING FLOOR  
 61327 CREDIT REPORTER  
 61330 FILE CLERK  
 61332 INSURANCE CLERK  
 61333 GENERAL CLERK, OFFICE  
 61335 DESK CLERK  
 61336 IN-FILE OPERATOR  
 61337 INFORMATION CLERK  
 61339 LIBRARY ASSISTANT  
 61343 MAIL CLERK  
 61344 CREDIT AUTHORIZER  
 61347 MESSENGER, BANK  
 61348 INSURANCE CLERK, MEDICAL  
 61349 NEW-ACCOUNTS TELLER  
 61350 ORDER CLERK  
 61351 PAYROLL AND/OR TIMEKEEPING CLERK  
 61352 PERSONNEL CLERK  
 61353 POLICY-CHANGE CLERK  
 61355 PROCUREMENT CLERK  
 61357 CREDIT REFERENCE CLERK  
 61358 RATER, INSURANCE  
 61360 REAL ESTATE CLERK  
 61361 RECEPTIONIST  
 61365 SAFE DEPOSIT CLERK  
 61368 SECRETARY  
 61372 STATEMENT CLERK  
 61373 SERVICE CLERK  
 61374 STATISTICAL CLERK  
 61375 SURVEY WORKER  
 61376 SWITCHBOARD OPERATOR  
 61377 SWITCHBOARD OPERATOR/RECEPTIONIST  
 61380 MESSENGER  
 61382 TELLER  
 61383 TICKET AGENT  
 61384 TITLE SEARCHER  
 61386 TRAFFIC CLERK  
 61389 TRANSIT CLERK  
 61390 TRAVEL COUNSELOR, AUTO CLUB  
 61391 TRAVEL CLERK  
 61392 TYPIST  
 61396 CLERICAL SUPERVISOR, OFFICE OR PLANT  
 61401 ELIGIBILITY WORKER, WELFARE  
 61410 TEACHER AIDE/EDUCATIONAL ASSISTANT  
 61416 CIRCULATION CLERK  
 61417 CLASSIFIED-AD CLERK, NEWSPAPER  
 61419 TELEPHONE AD-TAKER, NEWSPAPER  
 61420 INSURANCE CHECKER  
 61421 CREDIT CLERK  
 61422 MORTGAGE CLOSING CLERK  
 61423 CLAIM EXAMINER, LIFE/ACCIDENT/HEALTH  
 61424 SORTING CLERK, BANK  
 61425 COURT CLERK  
 61426 TOWN CLERK  
 61432 ADMISSIONS EVALUATOR  
 61433 PROOFREADER, CLERICAL  
 61434 LOAN CLOSER  
 61435 CUSTOMER SERVICE REPRESENTATIVE

61476 LICENSE CLERK  
 61900 ALL OTHER OFFICE CLERICAL WORKERS  
 62002 METER READER, UTILITIES  
 62003 PRODUCTION CLERK AND/OR COORDINATOR  
 62004 SHIPPING PACKER  
 62005 SHIPPING AND/OR RECEIVING CLERK  
 62007 WEIGHER, RECORD-KEEPING  
 62008 STOCK CLERK, STOCKROOM/WAREHOUSE STORAGE  
 62013 CREW SCHEDULER  
 62018 DISPATCHER, VEHICLE, SERVICE/WORK  
 62024 MARKING CLERK  
 62025 DISPATCHER, POLICE/FIRE/AMBULANCE  
 62030 TALLY CLERK, SAWMILL  
 62034 MANIFEST CLERK  
 62035 RATE CLERK, FREIGHT  
 62900 ALL OTHER PLANT CLERICAL WORKERS

## 70 SALES OCCUPATIONS

71000 SALES REPRESENTATIVES, AGT&ASSOCIATE  
 71002 BUSINESS BROKER  
 71003 CONTRIBUTION SOLICITOR  
 71004 CRATING-AND-MOVING ESTIMATOR  
 71006 REAL ESTATE BROKER  
 71008 SALES AGENT, ASSOC-REP, REAL ESTATE  
 71009 SALES AGENT, SECURITIES  
 71010 TRAFFIC AGENT  
 71012 SALES AGENT, ASSOC-REP, INSURANCE  
 71017 PORTFOLIO MANAGER  
 71900 ALL OTHER SALES AGENTS, ASSOC-REPS  
 71988 SALES REPRESENTATIVE, TECHNICAL  
 71999 SALES REPRESENTATIVE, NON-TECHNICAL  
 72002 SALES CLERK  
 72004 DEMONSTRATOR  
 72006 VENDOR  
 72007 SALES CLERK SUPERVISOR  
 79000 ALL OTHER SALES WORKERS

## APPENDIX E

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