27
11-26-80
jug

(1)

SAND80-7123
Unlimited Release
UC-70

MASTER

Socioeconomics Study for the Proposed Waste Isolation Pilot Plant

Adcock and Associates, Inc.

Prepared by Sandia National Laboratories, Albuquerque, New Mexico 87185
and Livermore, California 94550 for the United States Department
of Energy under Contract DE-AC04-76DP00789

Printed October 1980

Sandia National Laboratories

SF 2900-Q(3-80)

R149

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Issued by Sandia National Laboratories, operated for the United States Department of Energy by Sandia Corporation.

NOTICE: This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government, any agency thereof or any of their contractors or subcontractors. The views and opinions expressed herein do not necessarily state or reflect those of the United States Government, any agency thereof or any of their contractors or subcontractors.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

Master

SAND80-7123
Unlimited Release
Printed September 1980

SOCIOECONOMIC STUDY FOR THE PROPOSED
WASTE ISOLATION PILOT PLANT

Prepared for Sandia National Laboratories by
Larry Adcock and Associates
3010 Monte Vista N.E.
Suite 202
Albuquerque, NM 87106

ABSTRACT

This document presents the historical and existing socioeconomic conditions in the vicinity of the proposed plant, projected changes in those conditions with and without the plant, and an outline of the various techniques used to make these projections. The analysis predicts impacts on the general economy in the area near the plant and on employment, personal income, population, social structure, the private economic sector, housing, land use, community services and facilities, and local government finances. Among the most important results are the following predictions: The economy of the area will derive \$165 million directly and indirectly during the first 7.5 years of the project. After that, it will derive about \$21 million directly and indirectly during each year of full operation. About 2100 jobs will be created directly and indirectly at the peak of the construction and about 950 jobs during the full operation. A net in-migration will occur: about 2250 people at the peak of the construction and about 1000 people during operation. A housing shortage may begin in Carlsbad in 1981 or 1982 and last for about 2 years.

DISCLAIMER

The data and information contained herein are the property of Sandia National Laboratories and are not to be distributed outside the laboratory without the approval of the Laboratory Director. The data and information are provided for your information only and are not to be used for any other purpose without the approval of the Laboratory Director.

227

1

2

3

4

PREFACE

Under Section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), all agencies of the Federal government are required to prepare an environmental impact statement on any proposal for legislation or other major Federal action that would significantly affect the quality of the human environment. The Waste Isolation Pilot Plant (WIPP), proposed by the U.S. Department of Energy for construction in the southeastern region of New Mexico, would be such a major Federal action; a significant amount of research concerning its impacts on the human environment has been completed.

The Draft Environmental Impact Statement (DEIS) issued early in 1979 and the Final Environmental Impact Statement (FEIS) being prepared summarize the in-depth studies of the effects of the construction and operation of the WIPP. These documents report the results of the socioeconomic studies conducted for the assumed area of impact (Eddy and Lea Counties of New Mexico). The initial socioeconomic studies were conducted in early 1977 and revised in late 1977 because of changes in the plans for the construction and operation of the plant. These studies were updated and revised again in late 1979 to accommodate comments from readers of the DEIS and to account for changes that had occurred in the area since the completion of the original research.

The information contained in this document duplicates that of the socioeconomic component of the FEIS. In order to present a cohesive and complete document, however, certain changes in format, table titles, and, to a small extent, text were necessary. These changes do not affect the consistency between the material content, analysis, and conclusions of this report and those of the FEIS.

An attempt has been made to investigate the full range of socioeconomic conditions and impacts. This document and the FEIS contain socioeconomic information that may exceed in detail the information in environmental impact statements produced for other government actions.

1

2

3

4

5

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
PREFACE	iii
LIST OF TABLES	vii
LIST OF FIGURES.	xii
1. INTRODUCTION	1-1
2. SOCIOECONOMIC CONDITIONS IN THE PROPOSED REPOSITORY AREA	2-1
2.1 Population.	2-1
2.1.1 Historical Changes in the Population	2-1
2.1.1.1 Eddy County	2-1
2.1.1.2 Lea County.	2-1
2.1.2 Characteristics of the Population.	2-2
2.1.2.1 Ethnicity and Race.	2-2
2.1.2.2 Age Distribution.	2-3
2.1.2.3 Migration	2-3
2.1.2.4 Density	2-4
2.1.2.5 Demographic Changes	2-7
2.1.3 Characteristics of the Social Structure.	2-8
2.1.3.1 Employment Structure and Unions	2-8
2.1.3.2 Sociocultural Conditions.	2-8
2.1.3.3 Churches and Community Organizations.	2-12
2.1.3.4 Social Services	2-12
2.1.3.5 Community Planning Capabilities	2-12
2.2 Economic Setting.	2-20
2.2.1 General Economic Characteristics	2-20
2.2.1.1 Basic Industries.	2-20
2.2.1.2 Trade and Services.	2-21
2.2.1.3 Financial Resources	2-22
2.2.2 Labor Force.	2-24
2.2.2.1 Employment.	2-24
2.2.2.2 Unemployment.	2-26
2.2.2.3 Underemployment and Disguised Employment.	2-27
2.2.2.4 Major Employers	2-27
2.2.2.5 Personal Income	2-27
2.2.3 Housing and Land Use	2-29
2.2.3.1 Regional Land Use	2-29
2.2.3.2 Municipal Housing and Land Use.	2-29
2.2.4 Community Facilities	2-35
2.2.4.1 Education	2-35
2.2.4.2 Municipal Water Systems	2-38
2.2.4.3 Municipal Wastewater Systems.	2-42
2.2.4.4 Electric Service.	2-43
2.2.4.5 Natural-gas Service	2-45
2.2.4.6 Fire Protection	2-45

TABLE OF CONTENTS (cont'd.)

<u>Section</u>	<u>Page</u>
2.2.4.7 Law Enforcement	2-46
2.2.4.8 Health Care	2-47
2.2.4.9 Traffic and Transportation: Regional	2-49
2.2.4.10 Traffic and Transportation: Municipal	2-55
2.2.4.11 Communications Services and Facilities	2-57
2.2.4.12 Recreation	2-58
2.2.4.13 Solid-waste Management	2-60
2.2.5 Local Government Finances	2-62
2.2.5.1 Municipal Finances	2-62
2.2.5.2 County Finances	2-69
2.2.5.3 School District Finances	2-69
List of References	2-78
3. SOCIOECONOMIC EFFECTS OF REPOSITORY CONSTRUCTION AND OPERATION . .	3-1
3.1 Project Description, Setting, and General Impacts	3-1
3.1.1 General Economic Impacts	3-2
3.1.2 Other Events with Economic Impacts	3-3
3.1.3 Employment	3-3
3.1.3.1 Construction Phase	3-3
3.1.3.2 Operation Phase	3-6
3.1.4 Personal Income	3-7
3.1.4.1 Construction Phase	3-7
3.1.4.2 Operation Phase	3-7
3.1.4.3 Personal-income Distribution: Scenario I	3-7
3.1.4.4 Personal-income Distribution: Scenario II	3-8
3.1.5 Statewide Economic Impacts	3-8
3.2 Population	3-9
3.2.1 Population Growth	3-9
3.2.1.1 Distribution of Population: Scenario I	3-11
3.2.1.2 Distribution of Population: Scenario II	3-11
3.2.2 Population Within 10 and 50 Miles	3-14
3.2.3 Social Structure	3-14
3.2.3.1 Sociocultural Impacts	3-19
3.2.3.2 Labor Unions	3-23
3.2.3.3 Social Services	3-23
3.2.3.4 Churches and Other Community Organizations	3-24
3.3 Economic Setting	3-24
3.3.1 Private Sector	3-24
3.3.1.1 Industrial Activity	3-24
3.3.1.2 Trade and Services	3-26
3.3.1.3 Tourism	3-27

TABLE OF CONTENTS (cont'd.)

<u>Section</u>	<u>Page</u>
3.3.2 Housing and Land Use	3-28
3.3.2.1 Total Housing Requirements	3-28
3.3.2.2 Scenario I: Carlsbad	3-29
3.3.2.3 Scenario I: Loving	3-32
3.3.2.4 Scenario II: Hobbs.	3-35
3.3.3 Community Services and Facilities.	3-38
3.3.3.1 Scenario I: Carlsbad and Eddy County . . .	3-38
3.3.3.2 Scenario I: Loving	3-46
3.3.3.3 Scenario II: Hobbs and Lea County	3-50
3.3.4 Local Government Finances.	3-57
3.3.4.1 Scenario I: Carlsbad, Loving, and Eddy County	3-57
3.3.4.2 Scenario II: Hobbs and Lea County	3-65
3.3.4.3 School District Finances	3-70
3.3.5 Socioeconomic Effects Under Changed Circumstances. . .	3-70
List of References	3-77
APPENDIX A An Outline of the Input-Output Model and the Impact Projections Methodology	

LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
2-1	Population: Eddy and Lea Counties (1960, 1970, and 1979)	2-2
2-2	Characteristics of the Population: Eddy and Lea Counties (1970).	2-3
2-3	Percentage Age Distribution of the Population (1970).	2-4
2-4	Resident Population by Distance and Direction from the WIPP Site (1979).	2-7
2-5	Median Earnings By Occupation, Ethnic Group, and Sex: Eddy and Lea Counties (1969).	2-9
2-6	Percent of Families with Poverty Status by Ethnic Group and Sex of Household Head: Eddy and Lea Counties (1969). . .	2-9
2-7	Employed Persons by Industry, Sex, and Ethnic Group: Eddy and Lea Counties (1969).	2-10
2-8	Unions: Eddy and Lea Counties (1978)	2-11
2-9	Social Services: Carlsbad-Loving, New Mexico (1979).	2-13
2-10	Social Services: Hobbs, New Mexico (1979).	2-17
2-11	Banking Activity: Eddy and Lea Counties (1978)	2-23
2-12	Percentage Distribution of Employed Persons by Economic Sector: Eddy and Lea Counties.	2-26
2-13	Major Employers: Eddy and Lea Counties	2-28
2-14	Housing Stock: Carlsbad (1979)	2-32
2-15	Housing Stock: Hobbs (1979).	2-34
2-16	Housing Stock: Loving (1979)	2-34
2-17	Enrollment: Carlsbad School District	2-36
2-18	Enrollment: Hobbs School District (1978-1979 School Year)	2-37

LIST OF TABLES (cont'd.)

<u>Table</u>	<u>Title</u>	<u>Page</u>
2-19	Enrollment: Loving School District (1978-1979 Year)	2-38
2-20	Medical Facilities: Eddy and Lea Counties.	2-47
2-21	Solid-waste Disposal Systems.	2-61
2-22	Municipal Revenues: Carlsbad (1978-1979)	2-63
2-23	Municipal Expenditures: Carlsbad (1978-1979)	2-64
2-24	Municipal Revenues: Hobbs (1978-1979).	2-66
2-25	Municipal Expenditures: Hobbs (1978-1979).	2-67
2-26	Municipal Revenues: Loving (1978-1979)	2-68
2-27	Municipal Expenditures: Loving (1978-1979)	2-70
2-28	County Revenues: Eddy County (1978-1979)	2-71
2-29	County Expenditures: Eddy County (1978-1979)	2-72
2-30	County Revenues: Lea County (1978-1979).	2-73
2-31	County Expenditures: Lea County (1978-1979).	2-74
2-32	School District Revenues: Carlsbad, Hobbs, Loving (1978-1979)	2-75
2-33	School District Expenditures: Carlsbad, Hobbs, Loving (1978-1979)	2-77
3-1	Yearly Averages of the Number of Jobs Supported by the WIPP Repository: Eddy and Lea Counties	3-4
3-2	Population Migration Resulting from Jobs Directly and Indirectly Related to the WIPP Repository	3-10
3-3	Population Estimates and Projections for WIPP Scenario I. . .	3-12
3-4	Population Estimates and Projections for WIPP Scenario II . .	3-13
3-5	Resident Population by Distance and Direction from the WIPP Repository Site (1980, Maximum Impact--Scenarios I and II). .	3-15

LIST OF TABLES (cont'd.)

<u>Table</u>	<u>Title</u>	<u>Page</u>
3-6	Resident Population by Distance and Direction from the WIPP Repository Site (1990, Maximum Impact--Scenarios I and II). .	3-16
3-7	Resident Population by Distance and Direction from the WIPP Repository Site (2000, Maximum Impact--Scenarios I and II). .	3-17
3-8	Resident Population by Distance and Direction from the WIPP Repository Site (2010, Maximum Impact--Scenarios I and II). .	3-18
3-9	Estimated Annual Indirect Impacts on the Private Sector from Construction of the WIPP Repository.	3-25
3-10	Estimated Indirect Impact from a Typical Year of Full WIPP Operation, by Major Economic Sector	3-26
3-11	Total Annual Housing Demand Induced by the WIPP Repository. .	3-28
3-12	Annual Housing Demand for Scenario I: Carlsbad	3-30
3-13	Annual WIPP-Induced Housing Demand for Scenario I by Type of Dwelling: Carlsbad.	3-31
3-14	Annual Housing Demand for Scenario I: Loving	3-33
3-15	Annual WIPP-Induced Housing Demand for Scenario I by Type of Dwelling: Loving.	3-34
3-16	Annual Housing Demand for Scenario II: Hobbs	3-36
3-17	Annual WIPP-Induced Housing Demand for Scenario II by Type of Dwelling: Hobbs.	3-37
3-18	Current and Projected Yearly Enrollments: Carlsbad School District.	3-39
3-19	Acre-feet of Annual Water Demand: Carlsbad	3-40
3-20	Selected Traffic Flows and Road Capacities: Carlsbad	3-43
3-21	Current and Projected Yearly Enrollments: Loving School District.	3-47
3-22	Acre-feet of Annual Water Demand: Loving	3-48

LIST OF TABLES (cont'd.)

<u>Table</u>	<u>Title</u>	<u>Page</u>
3-23	Current and Projected Yearly Enrollments: Hobbs School District.	3-51
3-24	Acre-feet of Annual Water Demand: Hobbs.	3-52
3-25	Selected Traffic Flows and Road Capacities: Hobbs.	3-55
3-26	Baseline Municipal Finances: Carlsbad.	3-59
3-27	Impact of the WIPP on Municipal Finances: Carlsbad	3-60
3-28	Baseline Municipal Finances: Loving.	3-61
3-29	Impact of the WIPP on Municipal Finances: Loving	3-62
3-30	Baseline County Finances: Eddy County.	3-63
3-31	Impact of the WIPP on County Finances: Eddy County	3-64
3-32	Baseline Municipal Finances: Hobbs	3-66
3-33	Impact of the WIPP on Municipal Finances: Hobbs.	3-67
3-34	Baseline County Finances: Lea County	3-68
3-35	Impact of the WIPP on County Finances: Lea County.	3-69
3-36	Baseline Finances: Carlsbad School District.	3-71
3-37	Impact of the WIPP on Finances: Carlsbad School District . .	3-72
3-38	Baseline Finances: Loving School District.	3-73
3-39	Impact of the WIPP on Finances: Loving School District . . .	3-74
3-40	Baseline Finances: Hobbs School District	3-75
3-41	Impact of the WIPP on Finances: Hobbs School District. . . .	3-76

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page</u>
1-1	General Location of the WIPP Site	1-2
2-1	Population Within a 10-Mile Radius of the Site.	2-5
2-2	Area Covered by a 50-Mile Radius of the Site.	2-6
2-3	Map of Carlsbad Floodway.	2-25
2-4	Land Ownership Within 20 Miles of the Proposed WIPP Site. . .	2-30
2-5	Land Use Within 20 Miles of the Proposed WIPP Site.	2-31
2-6	Municipal Facilities, Water System, and Sewage Treatment Plants, Carlsbad.	2-39
2-7	Municipal Facilities, Water System, and Sewage Treatment Plant, Hobbs.	2-41
2-8	Municipal Facilities, Water System, and Sewage Treatment Plant, Loving	2-44
2-9	Average Daily Traffic Flow in the Area of the WIPP Site, 1978.	2-50
2-10	Average Daily Traffic Flow on NM 21, 1977	2-51
2-11	Road Conditions and Traffic Flow on NM 128, Selected Sections.	2-52
2-12	Road Conditions and Traffic Flow on US 62-180, Selected Sections.	2-53
2-13	Major Recreational Facilities in Eddy and Lea Counties. . . .	2-59
3-1	Carlsbad Average Daily Traffic, 1978.	3-44
3-2	Hobbs Average Daily Traffic, 1978	3-56

1. INTRODUCTION

This document contains the results of the socioeconomic studies prepared for the environmental impact statement concerning the construction and operation of the proposed Waste Isolation Pilot Plant (WIPP). The WIPP would provide an underground repository for demonstrating the disposal of "transuranic" radioactive waste produced in national-defense programs and another underground area for research and development in the disposal of high-level radioactive waste from those programs. The underground parts of the WIPP would be mined in bedded salt about 2150 feet below the surface of the ground; several buildings would be constructed at the surface for receiving the waste and moving it to the underground areas.

The WIPP would be located in Eddy County, New Mexico, southeast of the city of Carlsbad (see Figure 1-1). The analysis performed for this study assumes a construction starting date of mid-1980, with repository completion scheduled for late 1984. From the end of construction through the end of 1986, activity at the WIPP would consist of equipment checkout, preoperational testing, and the training of personnel. Full operation of the repository is assumed to begin in 1987 and continue for an indefinite length of time. These assumed dates are based on the schedule available in late 1979. The analysis is expected to remain valid for delays of up to two years if the actual starting time is substituted for mid-1980 and the other dates are adjusted accordingly.

The primary region of impact for socioeconomic effects has been defined as Eddy and Lea Counties, New Mexico. This definition is based on several factors including the proximity of the main population centers in the two counties (Carlsbad, Eddy County, and Hobbs, Lea County) to the proposed site, the interaction of economic bases in the two counties, and the commuting distances to the proposed site.

In this document the study results are divided into two sections with an attached appendix. Section 2 discusses the existing socioeconomic characteristics of the two-county area, while Section 3 relates the expected socioeconomic impacts resulting from the proposed construction and operation. Appendix A explains most of the technical procedures used to identify and analyze the socioeconomic impacts delineated in Section 3. The reader should be aware that the impacts in Section 3 and the procedures outlined in Appendix A assume constant 1979 dollars. Therefore, actual dollar flows after 1979 may be larger because of inflation.

Figure 1-1. General location of the WIPP site.

2. SOCIOECONOMIC CONDITIONS IN THE PROPOSED REPOSITORY AREA

2.1 Population

2.1.1 Historical Changes in the Population

2.1.1.1 Eddy County

In 1912, when New Mexico became a state, Eddy County contained approximately 9,600 people. By 1930 the population had grown to 15,842. After potash mining began in 1931, the population increased again (24,311 persons in 1940) and continued growing through 1960, principally because of the mining operations. By 1960 the population had reached 50,783. After 1960 the potash industry in the area became severely depressed and the population had decreased to 41,119 by 1970. Since 1970 the economy of the area has improved, and the population has again increased. The 1979 population estimate compiled for this report shows that Eddy County had 48,200 inhabitants, an increase of approximately 7,100 people over the 1970 Census figure. Since 1931 the population has fluctuated in conjunction with activity in the potash-mining industry (Table 2-1).

Within the county are four municipalities: Artesia, Carlsbad, Loving, and Hope. Carlsbad, the largest, had an estimated 28,600 inhabitants in mid-1979, up from the 25,541 in 1960 and 21,297 in 1970 (Table 2-1).

2.1.1.2 Lea County

Lea County was organized in 1917 from parts of Chaves and Eddy Counties and had 3,545 residents in 1920. Oil exploration, which began in southeastern New Mexico in 1924, brought substantial growth: by 1930 the population had increased to 6,144 and by 1940 to 21,154. Continued growth raised the population to 53,429 in 1960. Between 1960 and 1970 Lea County sustained a population decrease of approximately 7.3%, owing mainly to decreased oil and gas exploration and production. After 1970 the population increased from 49,554 to 57,500 in mid-1979. Most of the growth was related to increased activity in the oil and gas industry after 1973 (Table 2-1).

Lea County has five municipalities: Hobbs, Lovington, Eunice, Jal, and Tatum. Hobbs, the largest incorporated place in the county, had an estimated 1979 population of 32,600 (Table 2-1).

Table 2-1. Population: Eddy and Lea Counties (1960, 1970, and 1979)

Location	Distance from site ^a (miles)		Population		
	Air	Road	1960 ^b	1970 ^b	1979 ^c
Eddy County	NA	NA	50,783	41,119	48,200
Artesia	47	64	12,000	10,315	10,950
Carlsbad	26	33	25,541	21,297	28,600
Loving	18	23	1,646	1,192	1,600
Hope	61	80	108	90	190
Lea County	NA	NA	53,429	49,554	57,500
Eunice	35	49	3,531	2,641	2,550
Hobbs	41	51	26,275	26,025	32,600
Jal	37	47	4,133	3,241	2,700
Lovington	45	55	9,660	8,915	9,500
Tatum	64	77	1,168	982	900

^aDistance rounded to the nearest mile; NA = not applicable.

^bData from USDC (1970c).

^cData from Adcock (1979).

2.1.2 Characteristics of the Population

2.1.2.1 Ethnicity and Race

Eddy and Lea Counties are fairly homogeneous racially and ethnically (Table 2-2), with a relatively small Spanish-origin ethnic group. In comparison to the state, Eddy County has 25.4% of the population of Spanish origin or descent, more than double Lea County's 10.9%, but slightly below the statewide average of 30.3%. The American Indian population is also relatively low: 0.3% (258 individuals in 1970) in comparison with 7.2% for the state. The Black population (3.9%) is relatively high in comparison with the statewide figure (1.9%) (USDC, 1970b).

Table 2-2. Characteristics of the Population: Eddy and Lea Counties (1970)^a

Characteristic	Percentage of population ^b	
	Eddy County	Lea County
Race		
White	97.1	93.7
Black	2.2	5.3
Other	0.7	1.1
Spanish origin or descent	25.4	10.9
Residence		
Urban	76.9	81.1
Rural, nonfarm	18.1	15.1
Rural, farm	5.0	3.8

^aData from USDC (1970b).^bPercentages may not add to 100.00% because of rounding.

2.1.2.2 Age Distribution

The age distribution of the population in the two-county area differs slightly between the counties, as well as between New Mexico as a whole and the United States. In both Eddy and Lea Counties the median age (27.2 and 25.9, respectively) is below that of the United States as a whole (28.1) but significantly above New Mexico's median age of only 23.9 years in 1970. Carlsbad has a relatively low percentage of its population in the less-than-20 age group and a relatively high percentage in the over-50 age group (39.4% and 26.7%, respectively). The number of residents who are 65 or older is significantly higher in Carlsbad than the statewide average and the average for either Eddy or Lea County, mainly due to an active program to attract retirees which is supported by the Carlsbad area. The median age in Hobbs (25.5 years) is lower than that in Carlsbad (29.4 years) (Table 2-3).

2.1.2.3 Migration

Net-population-migration figures indicate significant changes during the last few years. In the 1960-1970 period the two-county area was somewhat depressed because of reduced hydrocarbon exploration and potash mining. As a result, between 1965 and 1970 Eddy County experienced a net loss of more than 11,000 individuals, and Lea County had a loss of approximately 5,200. Since the 1970 Census, however, there has been a significant change in the net migration trend, with both counties showing a reversal: Eddy County received a net migration gain of 3,700 during 1970-1979 and Lea County a net gain of 2,100 (Adcock, 1979).

Although net migration during the last 9 years has been positive, major growth in the two counties has been caused by natural increase (births minus deaths): about 3,400 persons in Eddy County and 5,800 persons in Lea County, or about 1.5 times the growth caused by in-migration (Adcock, 1979).

Table 2-3. Percentage Age Distribution of the Population (1970)^a

Age	Percentage age distribution					
	United States	New Mexico	Eddy County	Lea County	Carlsbad	Hobbs
Under 5	8.5	9.5	8.2	9.0	8.2	9.4
5-14	20.1	23.8	22.3	22.8	20.8	22.8
15-19	9.4	10.4	10.9	10.7	10.4	10.5
20-29	14.5	14.6	11.3	12.5	11.2	13.0
30-39	11.1	11.6	10.5	12.7	9.9	12.9
40-49	11.8	11.0	12.0	13.4	12.6	12.9
50-59	10.4	8.9	11.3	9.9	12.1	9.6
60-64	4.3	3.4	4.5	3.6	4.9	3.6
65+	9.9	6.9	8.8	5.4	9.7	5.3
Median age	28.1	23.9	27.2	25.9	29.4	25.5

^aData from USDC (1970a).

2.1.2.4 Density

Population densities in the two counties are relatively low but slightly higher than the 1979 statewide average of about 10.1 persons per square mile. The population density in Eddy County was 9.9 in 1970 and is now approximately 11.6 persons per square mile. The population density in Lea County was 11.3 in 1970 and is now estimated at 13.1 persons per square mile. It should be noted that the density figures are somewhat misleading because most of the population in Eddy County lives in Carlsbad and Artesia (74%). In Lea County slightly fewer than 85% of the total population live in four urban places. Thus, except for the six urban places, the two-county area is very sparsely populated (USDC, 1970c; Adcock, 1979).

Within 10 miles of the site are currently 16 permanent residents and three commercial mining operations (Figure 2-1) with a total daytime employment of about 650 persons and considerably smaller swing shifts and night shifts (Adcock, 1979).

Within 50 miles of the site (Figure 2-2) there were more than 102,000 inhabitants in 1979 (Table 2-4). The major population centers are listed in Table 2-1.

- A** Kerr-McGee plant and mine: 151 employees (maximum), day shift
- B** International Minerals and Chemical Corporation: 450 employees (maximum), day shift
- C** Duval Corporation (Nash Draw Mine): 46 employees (maximum), day shift
- D** James Ranch: six permanent residents (six seasonal part-time employees)
- E** Smith (Crawford) Ranch: seven permanent residents (18 seasonal part-time)
- F** Pue's Store: three permanent residents

Figure 2-1. Population within a 10-mile radius of the site.

Figure 2-2. Area covered by a 50-mile radius of the site.

Table 2-4. Resident Population by Distance and Direction from the WIPP Site (1979)^{a,b}

Sector	Distance from site (miles)						Total
	0-5	5-10	10-20	20-30	30-40	40-50	
North	0	0	35	25	175	25	260
North-northeast	0	0	25	5	55	5,610	5,695
Northeast	0	0	0	25	75	8,660	8,760
East-northeast	0	0	15	70	205	33,200	33,490
East	0	0	5	15	3,240	155	3,415
East-southeast	0	0	5	10	3,035	295	3,345
Southeast	0	0	5	15	25	30	75
South-southeast	0	0	0	25	10	40	75
South	0	0	5	15	55	15	95
South-southwest	6	0	5	30	90	15	145
Southwest	0	0	55	30	10	45	140
West-southwest	0	0	1,750	200	50	65	2,065
West	0	0	70	31,780	40	35	31,925
West-northwest	0	10	5	190	55	50	310
Northwest	0	0	30	20	65	12,055	12,170
North-northwest	0	0	15	5	220	10	280
Subarea total	6	10	2,025	32,460	7,440	60,305	102,245
Cumulative total	6	16	2,040	34,500	41,940	102,245	--

^aPopulation estimated by Adcock and Associates (1977-1979).

^bFigures for all areas beyond the 10-mile radius have been rounded to the nearest 5.

Population projections to the year 2010 are presented in Section 3, Tables 3-3 through 3-8. From 1980 to 2010 Eddy County population is projected to grow at a compound annual rate of 1.7% and Carlsbad at an annual rate of just more than 1.8%. Lea County growth for the 30-year period is approximately 1.3% per year, and the projected annual growth rate for Hobbs is about 1.4% (Adcock, 1979).

2.1.2.5 Demographic Changes

Few demographic changes are expected within 10 miles of the site in the foreseeable future. Interviews with ranch owners and managers indicate that one ranch house is expected to be built in the next 5 years, at the Mobley ranch just south of NM 128, approximately 8 miles west-southwest of the center of the site (Figure 2-2).

One other demographic change may occur north-northeast of the site, just outside the 10-mile radius. A small trailer park (approximately 20 units) is being built near the commercial establishment now known as the Halfway Bar (located on U.S. 62-180). Future plans for further trailer-park development are reported to be partially contingent on the construction of the WIPP repository (Adcock, 1979).

The population of workers at various mining operations in the 10-mile radius has varied from one period to another. During 1960-1970, the employment level dropped significantly because of a decreased demand for potash produced in the Carlsbad area. Potash production now appears to have stabilized, at least for the near future. This work force is not expected to change significantly in the next few years.

Maintenance workers for oil and gas wells are transients in the area. The number of active oil and gas wells in Eddy County has been increasing during the past few years, and there are many active wells within 10 miles of the site. Although the average number of workers in the area is not known, it is not expected to increase significantly during the next few years.

2.1.3 Characteristics of the Social Structure

2.1.3.1 Employment Structure and Unions

In 1970, nearly 90% of the employed in Eddy County were wage and salary workers (74% in the private sector, 16% in the government sector), approximately 9% were self-employed, and 1% were unpaid family workers. In Lea County a slightly larger proportion of wage and salary workers were in the private sector and a correspondingly smaller proportion (12%) were in the government sector (USDC, 1970c, 1975-1979).

A large proportion of employed workers are blue collar (craftsmen and foremen, operatives, nonfarm laborers, and farm laborers), with 45% of Eddy County workers and 49% of Lea County workers belonging in this category in 1970 (USDC, 1970c). Data on earnings, poverty, and employment are given in Tables 2-5, 2-6, and 2-7.

Five unions are represented in Eddy and Lea Counties (Table 2-8); the largest is the United Steelworkers Union. Four unions have local headquarters in Eddy County.

2.1.3.2 Sociocultural Conditions

During September and October 1979, unstructured discussions were held with approximately 200 local residents of the Carlsbad area. A number of general topics were covered in an attempt to determine the sociocultural attitudes of persons residing in the general area of the proposed WIPP repository. These persons were asked to describe their feelings about their local communities and various issues related to the quality of life in the area. The topics of discussion included attachment to the community, political processes, and land use. (Albrecht and Chadwick, 1980.)

Table 2-5. Median Earnings by Occupation, Ethnic Group, and Sex: Eddy and Lea Counties, (1969)^a

Occupation	Median earnings					
	Eddy County			Lea County		
	All groups	Spanish	Black	All groups	Spanish	Black
Males 16 and older						
with earnings	\$7,068	\$4,286	\$4,820	\$7,695	\$4,883	\$4,225
Professional, manager	9,158	4,808	--	9,909	8,000	--
Crafts, foreman	8,050	6,667	4,375	8,127	6,085	5,211
Operatives	7,244	5,019	7,078	7,629	4,477	4,853
Nonfarm labor	4,297	3,306	5,469	3,793	3,800	3,500
Farmers and managers	6,729	5,533	--	4,944	--	--
Farm laborers and foremen	2,960	2,871	--	3,608	3,350	--
Females 16 and older with earnings	\$2,810	\$1,596	\$ 994	\$2,707	\$1,435	\$1,066
Clerical	3,551	2,575	--	3,551	1,875	--
Operatives	1,241	830	--	2,079	848	875

^aData from USDC (1970b).

Table 2-6. Percent of Families with Poverty Status by Ethnic Group and Sex of Household Head: Eddy and Lea Counties, (1969)^a

Families with income below poverty level	Percentage of all families	
	Eddy County	Lea County
All families	17.8	12.5
Spanish	41.5	31.5
Black	24.4	50.7
Families with female head	50.0	47.0

^aData from SDC (1970b).

Table 2-7. Employed Persons by Industry, Sex, and Ethnic Group: Eddy and Lea Counties (1969)^a

Total employed 16 and older	Eddy County					Lea County				
	Total	Male	Female	Spanish	Black	Total	Male	Female	Spanish	Black
Number	14,145	9,374	4,771	3,046	364	18,255	12,745	5,510	1,571	729
Percent of total										
Agriculture	7	9	1	17	4	5	6	1	10	3
Mining	21	38	3	11	12	27	45	6	19	7
Construction	6			6	2	6			14	12
Manufacturing	5	6	3	6	7	5	6	3	4	1
Transportation, communication & utilities	7	8	4	6	6	7	8	5	4	5
Wholesale trade	3	4	1	2	--	3	4	1	2	2
Food, bakery & dairy stores	2	2	4	3	--	3	2	4	3	2
Eating and drinking establishments	3	1	6	3	2	4	1	11	7	5
Other retail	11	10	13	12	9	12	10	16	14	6
Finance, insurance, & real estate	3	3	5	1	4	3	2	5	2	2
Business and repairs	2	3	2	2	--	4	4	3	3	3
Personal and other services	7	3	16	10	32	5	2	14	8	32
Entertainment & recreation	1	1	1	1	3	1	1	1	1	6
Health services & hospitals	6	2	13	4	2	3	1	8	2	3
Education	9	5	18	10	5	7	3	14	3	6
Other professions	4	3	6	3	5	3	2	5	2	4
Public administration	4	4	4	3	7	3	3	3	1	1

^aData from the 1970 Census of Population.

Table 2-8. Unions: Eddy and Lea Counties, (1978)^{a,b}

Name of union	Number of members	Areas and activities covered
Carpenters' Local 1245	266	Carlsbad, Hobbs, Roswell Portales, Clovis, Tucumcari; construction contractors
International Brotherhood of Electrical Workers Local 693	259	Eddy and Lea Counties; electrical workers at potash mines (Duval, Potash Company of America, and Mississippi Chemical); four out of five local construction contractors
Iron Workers Local 775	40	Eddy and Lea Counties; local construction contractors, potash mines
Retail Clerks Local 462 ^c	325	Eddy and Lea Counties; retail stores, grocery and department stores
United Steel Workers Locals 177, 178A, 181, 183, 187, 188A, 8507	1560	Eddy and Lea Counties; potash mines, Carlsbad city employees, school custodial and maintenance workers

^aData from Adcock (1979).

^bLocal offices in Carlsbad unless otherwise indicated.

^cLocal offices in Las Cruces.

A clear majority of the interviewees rated the Carlsbad area as an above-average area in which to live. Their reasons included climate, the friendliness of residents, access to recreational facilities, and the rural nature of the area. Those rating it average or below average cited excessive heat, high living costs, a lack of adequate commerce, and a dearth of cultural amenities as reasons.

A significant majority of those interviewed expressed a sense of belonging to the community, but a small percentage felt that they were excluded from the political process. Some people voiced concern about racial or ethnic relationships, though most interviewees suggest that the problem was less serious now than it has been in the past. A large number stressed that there were no racial problems. It is important to note that very few persons perceived any conflict between old and new residents. Overall, the interviewed persons characterized local residents as friendly, helpful, honest, and good.

In contrast to the positive attitudes about the community, approximately half the interviewees felt they had no realistic opportunity to affect political events. They felt that their attempt at involvement in the political process was unsuccessful. Furthermore, many of the responding persons saw no reason for becoming involved and were not interested in attempting to do so. Only a small minority perceived an ability to influence decision making.

Attitudes toward elected officials and their representation of the local constituency were generally consistent with the feelings about ability to affect local government decisions. Approximately half the interviewees felt well represented, while the other half did not. Those who did perceive a lack of good representation believed that only the wealthy and special interests are taken into account.

Local residents show a general preference for retaining the current environment in the Carlsbad area. The local consensus on land-use patterns leaned toward no changes or only very minor ones. The changes most frequently mentioned as desirable are increased agricultural development, mineral development, and urbanization-industrialization.

2.1.3.3 Churches and Community Organizations

Carlsbad has 60 churches and 1 synagogue; Hobbs has 70 churches and 1 synagogue; Loving has 3 churches. Of these churches, two in Carlsbad and one each in Hobbs and Loving are Catholic. Many of the remaining churches are Protestant (BBER, 1977a,b; Adcock, 1979).

There are 22 major civic and community organizations in Hobbs, 13 in Carlsbad, and 2 in Loving. Most of these are fraternal organizations, with membership in many restricted to men, although many have auxiliaries for wives (Adcock, 1979).

2.1.3.4 Social Services

The social services available in both the Carlsbad-Loving area and in the municipality of Hobbs are rather extensive and cover a wide range of activities. The organizations providing these services are listed in Tables 2-9 and 2-10 for Carlsbad-Loving and Hobbs, respectively.

2.1.3.5 Community Planning Capabilities

Carlsbad and Hobbs are experiencing considerable growth in population and housing; this growth is expected to continue throughout the mid-1980s and probably into the year 2000. Both communities have planning agencies and various other city agencies that analyze growth and assist in its management.

The village of Loving, which has also experienced growth since 1970, currently has no municipal planning department (Adcock, 1979).

Table 2-9. Social Services: Carlsbad-Loving, New Mexico (1979)^a

Type of service or facility	Total staff ^b	Total participants ^c	Program or activity
MENTAL HEALTH AND HEALTH SERVICES			
Carlsbad Area Resource and Counseling Center	19	373	Rape Crisis Center Hotline Crisis Center First Offenders Program Mental health services Treasure House Activity Center Youth service counseling Family counseling Parents Anonymous Testing and evaluation Drug abuse clinic
Alcoholism Council of South Eddy County	6	60	Outpatient counseling Group counseling Seminars and lectures Initial screening for Cavern Lodge Halfway House
El Centro Rural de Salud	6	500	Primary medical care Prenatal care Family planning Social worker Counseling
Eddy County Health Center	16	3000-5000	Family planning Prenatal care Child care clinic Maternity education Immunization program Crippled childrens services Social worker, South Eddy County Womens, Infants, Children Nutrition Program (WIC) Vital statistics

Table 2-9. Social Services: Carlsbad-Loving, New Mexico (continued) (1979)^a

Type of service or facility	Total staff ^b	Total participants ^c	Program or activity
SENIOR CITIZEN SERVICES			
Eddy County Senior Citizens Program	NA	200 daily	Senior Citizens Nutritional Mealsite Recreation
Senior Recreation Center	4	550 daily	Recreation Club meetings Classes
Loving Mealsite Nutritional Program	NA	50 daily	Senior Citizens Nutritional Mealsite Recreation
DAY CARE AND PRESCHOOL SERVICES			
Cottage Preschool	4	34	Informal education Day care
Hillcrest Day Care Center	6	35	Informal education Day care
Harding Webster Preschool	NA	NA	Informal education Day care
First United Methodist Preschool	4	39	Informal education Day care
YOUTH SERVICES			
Campfire Girls	NA	NA	Informal education and vocational guidance Recreation
Boys Club of Carlsbad	3	600	Organized sports Recreation Library
OTHER SERVICES			
American Red Cross	2	200	Water safety training Blood-donor program Cardiopulmonary Resuscita- tion Training (CPR) First-aid training Disaster relief Blood-pressure screening Services to military families

Table 2-9. Social Services: Carlsbad-Loving, New Mexico (continued) (1979)^a

Type of service or facility	Total staff ^b	Total participants ^c	Program or activity
EDUCATIONAL, VOCATIONAL, AND REHABILITATION SERVICES			
Carlsbad Child Development Center	2	6-20	Preschool--handicapped children Family counseling
Carlsbad Association of Retarded Citizens Farm	NA	20-25	Counseling Vocational rehabilitation Recreation
STATE AND FEDERAL SERVICES			
Community Action Programs	125	550-600	Family planning Head Start Program Rural Health Clinic, Loving Weatherization program Rural housing program Senior Citizens Nutritional Program Summer youth recreation Emergency energy assistance Crisis Intervention Program Youth tutoring Home Education Livelihood Program
New Mexico Social Services Division	14	463	Referrals Protective service for children and adults Disease investigation Adult services Adoption Foster care Nursing Home Discharge Planning Homemakers Service Permanency Planning for Children Day care Family planning Health support Critical in-home care Drug abuse Youth services Legal services Emergency shelter Family counseling

Table 2-9. Social Services: Carlsbad-Loving, New Mexico (continued) (1979)^a

Type of service or facility	Total staff ^b	Total participants ^c	Program or activity
Employment Services Division	20	463	Employment information and referral Aid to Families with Dependent Children (AFDC)

^aData from Adcock (1979).

^bData for 1979; NA = not available.

^cMonthly estimates unless otherwise indicated.

Table 2-10. Social Services: Hobbs, New Mexico (1979)^a

Type of service or facility	Total staff ^b	Total participants ^c	Program or activity
MENTAL HEALTH AND HEALTH SERVICES			
Crisis Center of Lea County	25	500	Day activities for senior citizens Group therapy Alcohol abuse Child services Parent education services Drug abuse Medication Program Methadone Program Educational programs for public schools Rape Crisis Program Volunteer Shelter Bed
Parents Anonymous (prevention and treatment of child abuse)	4	200	Telephone hotline and referral Group meetings
Mental Health Activity Center	1	119	Recreation, socials Special education, gifts and parties Special Olympics Annual scholarships
SENIOR CITIZEN SERVICES			
Senior Citizens Center	6	1070	Classes Dances Workshops Luncheons Meals on Wheels Information and referral Occasional transportation services
Good Samaritan Village	68	124	Residence, recreation, entertainment
La Siesta Retirement Center	37	55	Nursing, residence, recreation

Table 2-10. Social Services: Hobbs, New Mexico (continued)^a

Type of service or facility	Total staff ^b	Total participants ^c	Program or activity
EDUCATIONAL, VOCATIONAL, AND REHABILITATION SERVICES			
Child Development Center of Lea County	4	79	Level D special education Speech therapy Physical therapy
Vocational Rehabilitation (oil-field injuries)	2	35	Medical treatment Counseling Reeducation Arranging financial assistance
Lea Work Activity Center (for the handicapped)	7	36	Recreation Community services Transportation
STATE SERVICES			
Social Services Division	24	600	Counseling services Limited critical in-home care Family planning Health support Homemaker services Information and referral Adoption services Day care Protective services for children Foster care
Employment Services Division	9	337	Information and referral Aid to Families with Dependent Children (AFDC)
DAY CARE AND PRESCHOOL SERVICES			
Kinder Care Learning Centers, Inc.	9	88	Informal education, day care
Washington Nursery	10	90	Day care
Little People's Kountry Kindergarten	3	21	Informal education, day care

Table 2-10. Social Services: Hobbs, New Mexico (continued) (1979)^a

Type of service or facility	Total staff ^b	Total participants ^c	Program or activity
YOUTH SERVICES			
Boys Club of Hobbs	5	1300	Indoor recreation Library Television Organized sports
Girl Scout House	1	1000	World of Arts World of People World of the Out-of-Doors World of Well-Being
Junior Achievement of Hobbs	NA	NA	Recreation Community service
OTHER SERVICES			
American Red Cross	1	270	Services to military families Disaster relief Blood-pressure screening Water safety training Blood-Donor Program Cardiopulmonary Resuscita- tion Training (CPR) First-aid training

^aData from Adcock (1979).^bData for 1979; NA = not available.^cMonthly estimates unless otherwise indicated.

2.2 Economic Setting

2.2.1 General Economic Characteristics

As defined by standard economic-base theory, there are three basic economic sectors in Eddy and Lea Counties: mining, manufacturing, and agriculture. Although government is a basic industry* in many parts of New Mexico because of heavy federal activity, most governmental activity in Eddy and Lea Counties performs only a supportive function (USDC, 1975-1979). The nonbasic sectors in the two counties include contract construction; transportation, communications, and utilities; trade; finance, insurance, and real estate; and services. Certain activities in the retail-and-services sector are larger than might be expected because of heavy tourist traffic (Carlsbad Caverns). Transportation facilities and the transportation sector in the area are well developed because of the heavy industry.

2.2.1.1 Basic Industries

Mining, which includes oil and gas extraction, is the major industry in both counties. In 1978 mining employed approximately 3,600 and 6,000 persons in Eddy and Lea Counties, respectively. In both counties employment in mining was substantially higher than in any other industrial sector (NMESD, 1975-1979). In Eddy County potash mining employs more than nine out of ten persons working in this sector. Figures for 1977 showed that New Mexico (Eddy and Lea Counties) supplied 93% of the total potash mined in the United States (USBM, 1978). In Lea County mining is centered on oil and gas (5,800 employees in 1978); mining in potash, sand and gravel, rock salt, and caliche employed fewer than 200 people in 1977 (NMESD, 1975-1979).

In Eddy County personal income from mining accounted for more than 24.6% of total personal income in 1977. In Lea County this figure was just more than 31.2%. Moreover, the impact of mining is increasing: personal income from mining rose approximately 170% from 1970 through 1977 while that from all other sources rose 118% over the same period (USDC, 1975-1979).

At the beginning of 1978, there were 43 manufacturing companies with approximately 920 employees in Eddy County and 51 manufacturing companies with approximately 1085 employees in Lea County. In 1976 manufacturing was second in personal income generated by a basic industry. However, the total personal income from manufacturing was only 5.2% of all personal income generated in the two-county area (NMESD, 1975-1979).

In 1975 the principal subsector of agriculture in the two-county area was meat animals and livestock. In the immediate area of the WIPP site, (10-mile radius), agriculture is restricted to cattle grazing. Personal income from agriculture in 1975 was less than 4% of the total personal income in the two-county area.

*Basic industries are those whose level of activity is not closely tied to the level of economic activity in the local community (Tiebout, 1962, p. 74).

2.2.1.2 Trade and Services

The 1972 Census of Business shows 454 retail outlets in Eddy County and 614 in Lea County, for a total of 1,068. In Eddy County the majority, 281, are located in Carlsbad. The total retail sales volume in 1972 was about \$185.9 million, or just over 8% of the statewide total of more than \$2.3 billion. Although little sales-volume information is available after 1972, retail sales in the area have increased substantially. During the period 1972-1978, employment in wholesale and retail trade increased from an average of 2,500 to approximately 3,500 in Eddy County and from approximately 3,600 to 5,200 in Lea County (NMESD, 1975-1979).

The Rand-McNally 1978 Commercial Atlas and Marketing Guide shows both Eddy and Lea Counties as basic trade areas (i.e., areas in which normal retail-trade purchases are made). Rand-McNally defines 50 major trade areas with a major central city from which substantial retailing and wholesaling operations are conducted. The Carlsbad basic trade area, Eddy County, is in the major trade area of El Paso; the Hobbs trade area, Lea County, is in the major trade area of Dallas. It is important to note that the basic trade areas for both Carlsbad and Hobbs do not extend beyond their respective county limits to any significant degree. Therefore, Rand-McNally notes few leakages in normal retail purchases from the two-county area. However, for major retail purchases and wholesaling there is substantial leakage out of the state into El Paso and Dallas.

There were 835 service establishments (e.g., hotels, motels, barber shops, advertisers, business services, repair shops) at the time of the 1972 Census of Business. Activity in this sector increased substantially during the period 1972-1978, with service-sector employment in Eddy County rising from approximately 1,900 to 2,700 and in Lea County from approximately 1,800 to 2,300 (NMESD, 1975-1979).

Tourism

Tourism contributes substantially to economic activity in the two-county area, particularly in Eddy County. The main tourist attraction in the area is Carlsbad Caverns National Park, which is approximately 22 miles southwest of Carlsbad and 41 miles west-southwest of the site. In 1978 it received 867,276 visitors, or nearly 44% of the visitors to all 11 national parks and monuments throughout the state (USDI, 1970-1978). Other nearby parks (Guadalupe Mountains National Park, Living Desert State Park, the Presidents' Park in Carlsbad, and others) also attract local residents and tourists.

The effects of tourism in the area can be readily seen in employment statistics, with retail trade and selected services being most affected. For example, employment in eating and drinking establishments more than triples in the 3 summer months, and summer employment in lodging increases 60 to 70% over

winter employment (NMESD, 1975-1979). Other secondary and tertiary services (e.g., curio sales, barber shops, cleaners) also show substantial increases in employment during the peak tourism season.

Tourism is highly seasonal, with visits to Carlsbad Caverns fluctuating from a high of 187,970 in July 1977 to a low of 25,350 in January (USDI, 1970-1978). To support the tourist industry, Carlsbad, which receives most of the impact from the visitors to the national park, has a total of 20 motels and hotels with approximately 1,100 rooms (Carlsbad Department of Development, 1979).

2.2.1.3 Financial Resources

In Eddy and Lea Counties there are a total of nine chartered banks, four holding state charters and five holding national charters. Five of these nine banks (three state and two national) are in Eddy County. Assets, liabilities, and deposits as of December 31, 1978, are reported in Table 2-11.

There are four savings and loan institutions in the two-county area. The three with main offices in Eddy County are mutual savings and loan institutions with combined assets of more than \$148.3 million and total savings accounts of more than \$118.9 million. The savings and loan institution with a main office in Lea County at Hobbs is a capital-stock institution; it has total assets of more than \$27.4 million and about \$21.3 million in total savings accounts.

There are three credit unions in the two-county area. The two credit unions in Eddy County (one in Carlsbad and one in Artesia) are for school employees; both are insured by the National Credit Union Administration. They have combined assets of more than \$2.7 million and combined shares and deposits of just over \$2.2 million. The credit union in Lea County at Lovington, insured by the New Mexico Credit Union Insurance Corporation, has total assets of over \$1.4 million and total shares and deposits of \$1.2 million.

Nineteen small-loan licensees are doing business in the two-county area. Ten are in Eddy County: six in Carlsbad, three in Artesia, and one in Loving. Nine are in Lea County: six in Hobbs, one in Jal, and two in Lovington (NMDB, 1979).

In Carlsbad the savings and loan institutions are the principal sources of long-term (25-30 years) mortgages. The banks provide some additional short and intermediate-term financing. In Hobbs the banks and savings and loan association all provide long and short-term mortgage money.

At present (November 1979), the mortgage market in the two-county area is strained, not unlike the mortgage markets in other parts of the country. The high interest rates available on such investments as government securities and money market funds compared to the low (controlled) interest rates paid by banks and savings and loan institutions on conventional types of savings have made the latter a relatively less attractive form of investment for many savers. This has limited the availability of funds which banks and savings and loan institutions can make available for mortgages.

Table 2-11. Banking Activity: Eddy and Lea Counties (1978)

Location	State Banks	Branches	National Banks	Branches	Total Assets (\$ million)	Total Liability (\$ million)	Equity Capital (\$ million)	Total Deposits (\$ million)
New Mexico	46	113	40	111	4,904.7	4,547.1	323.8	4,296.3
Eddy County	3	4	2	1	231.9	213.3	16.9	211.2
Carlsbad	2	4	2	1	143.2	133.0	9.4	131.0
Artesia	1	0	1	0	88.7	81.2	7.5	80.1
Lea County	1	7	3	8	342.0	317.9	19.4	302.4
Hobbs	1	7	2	5	297.7	276.3	17.4	261.2
Lovington	0	0	1	3	44.3	41.6	2.0	41.3

Data from Sixty-fourth Annual Report, New Mexico Department of Banking, issued 1979 (December 31, 1978 data).

Moreover, the New Mexico usury law places a 10% ceiling on mortgage interest rates. This makes mortgage loans a relatively unattractive form of investment for the banks and savings institutions.

The factors limiting the availability of mortgage money are mitigated somewhat by periodic provision of funds for low interest residential mortgages by the New Mexico Finance Authority (NMFA). The NMFA funds are distributed throughout Lea and Eddy Counties by financial institutions in the area. During 1979, NMFA funds bearing a 7.75% interest rate were available throughout the area. However, these funds were not adequate to satisfy fully mortgage demand in the two counties.

The net effect of these factors is that, generally, local mortgage loans are available only for construction of owner-occupied single-family dwellings. Funds for other types of construction must be obtained from outside the area (generally, from outside the state).

In Carlsbad, the mortgage financing picture is further complicated by the failure of the city to enact zoning regulations which would qualify the city for participation in the federal flood insurance program. The lack of availability of flood insurance has resulted in local lending institutions limiting mortgage loans to areas outside of the 100-year flood plain (Figure 2-3).

Because of Loving's proximity to Carlsbad (12 miles), its residential and commercial mortgage-loan market reflects the conditions existing in Carlsbad.

2.2.2 Labor Force

Labor force is defined by the U.S. Department of Labor as persons who are employed and those who are unemployed and are actively seeking employment. In the first 6 months of 1979 the combined total labor force in Eddy (19,905) and Lea (25,815) Counties was approximately 45,700. Total employment in the two-county area was 43,855 (NMESD, 1975-1979).

Between 1974 and 1978 the economy of both counties expanded and the total labor force increased by approximately 7,800 individuals (20.6% for the period; 4.8% annually). The overall growth of employment for the 4-year period was 22.4% or about 5.2% annually. Therefore, the number and percentage of unemployed persons has decreased during the last 4 years. Although the combined unemployment rate for the two counties in the first 6 months of 1979 was approximately 4.1% the rate differs significantly between Eddy (4.3%) and Lea (3.9%) Counties (NMESD, 1975-1979).

2.2.2.1 Employment

Mining is by far the largest employer in the two-county area. Accurate figures on agricultural employment are difficult to obtain and are frequently out of date; the latest available credible information shows just under 2000 employees in the two counties in 1977 (USDC, 1975-1979). In 1978 manufacturing employed approximately 2,000 persons: 921 in Eddy County and 1,087 in Lea County (NMESD, 1975-1979).

Figure 2-3. Map of Carlsbad floodway.

The distribution of employment among industrial sectors is presented in Table 2-12.

Table 2-12. Percentage Distribution of Employed Persons by
Economic Sector: Eddy and Lea Counties

Industry	Percentage distribution ^a
Agriculture	5
Mining	26
Manufacturing	5
Construction	6
Transportation, communications, and utilities	9
Wholesale and retail trade	24
Finance, insurance, and real estate	4
Services	13
Government	12

^aData from the New Mexico Employment Security
Department (1975-1979). Percentages do not add to 100%
because of rounding.

2.2.2.2 Unemployment

Unemployment in the two-county area is lower than the state average; the 1978 average rates were 4.5% in Eddy County and 4.0% in Lea County. Seasonal unemployment rates vary significantly, with higher rates during June and lower rates in late spring and late fall. The variations occur primarily because of fluctuations in the summer-month employment patterns of agricultural, student, and certain noncontract school personnel (NMESD, 1975-1979).

Applications for work filed with the New Mexico Employment Security Department (formerly the Employment Security Commission) reveal that a large number of people with technical skills, many directly connected with construction and mining, and a large number of clerical and secretarial workers are available in the area.

2.2.2.3 Underemployment and Disguised Unemployment

The unemployment rates computed by the state and federal governments are based on persons actively seeking employment. An area may sometimes concurrently have a low level of defined unemployment and significant underemployment (i.e., occupations or jobs that do not take full advantage of an employee's potential). Although labor statistics and wage rates indicate that there may be some underemployment because of seasonal employment patterns in the two-county area, underemployment does not appear to be a significant factor in the assessment of the labor market.

Disguised unemployment may exist when many persons who are not actively seeking employment would take a job if one were available in the area. Disguised unemployment is measured by comparison of labor-force participation rates. In the two-county area the labor-force participation rate for males is higher than the state average, while the rate for females is lower than the state average (USDC, 1970c). These data imply that not all females who are willing to work are actively seeking employment and that the labor-force availability for females may be greater than current statistics indicate.

2.2.2.4 Major Employers

Nine of the 20 major employers in the two-county area are mining or service-to-mining companies (Table 2-13). Only two of the 20 major employers, Levi Strauss and the Holly and Navajo Corporation, are listed by the Employment Security Department as manufacturing companies.

2.2.2.5 Personal Income

The total annual personal income in 1977 was listed by the Bureau of Economic Analysis as \$276.8 million in Eddy County and \$360.5 million in Lea County. The two-county area accounts for about 9% of the total annual personal income of all state residents. The total annual personal income in Lea County has been showing steady increases in recent years. Because of declines in the potash industry during the middle and late 1960s, Eddy County sustained a decrease in the total personal income in 1968 and in 1969 barely reached the level attained in 1967; since 1968, however, it has shown increases. While information after 1977 is not available, trends in the area and in the state indicate that the total personal income in the two-county area has been increasing at more than 12% per year since 1976 (USDC, 1975-1979).

Table 2-13. Major Employers: Eddy and Lea Counties^a

Number of employees	Company	Service
EDDY COUNTY		
151-250	Mississippi Chemical Lakeview Christian Home Holly and Navajo Corporation	Mining Retirement home Refining
251-500	Kerr-McGee Corporation Duval Corporation Amax Chemical Guadalupe Medical Center	Mining Mining Mining Medical
501-750	Potash Company of America (Ideal Basic Industries) International Minerals	Mining Mining
Not known	Evangelical Lutheran Center	Nursing home
LEA COUNTY		
100-150	Halliburton Company Moran Company First National Bank	Oil field Oil-well drilling Banking
151-250	B&M (well service) Levi Strauss General Telephone	Oil field Manufacturing Utility
251-750	Lea County Regional Hospital El Paso Natural Gas	Medical Refining natural gas
	National Potash	Mining
Not known	M.G.F. Drilling Company	Oil-well drilling

^aData from the Carlsbad Department of Development (1977-1979) and the Industrial Development Corporation of Lea County (1979).

The per-capita annual income in the two counties is higher than that in the state: in 1977 it was \$6,811 in Lea County, or approximately 16.5% above the \$5,846 registered statewide level, and \$6,089 in Eddy County, about 4.2% above the statewide level. In Lea County the per-capita income increased 118.5% between 1970 and 1977, while in Eddy County the increase was only slightly less at 101.7%. The statewide level increased 99.8% during the same period; thus the per-capita income for the two-county area is increasing faster than the statewide average. It is important to note that the per-capita income in both counties is above the national average for non-SMSA (Standard Metropolitan Statistical Area) counties. In Lea County the per-capita income is 118.2% of the non-SMSA county national average, while the Eddy County level is 106.0% (USDC, 1975-1979).

2.2.3 Housing and Land Use

2.2.3.1 Regional Land Use

Figures 2-4 and 2-5 show land ownership and use within 30 miles of the WIPP site. These maps show that there is little private land in the area. Most of the land is owned by the federal government or the state of New Mexico.

The dominant use of the land around the site is grazing; the areas marked for oil and gas production in Figure 2-5 also support grazing. The average number of cattle that can graze in each section is approximately six to nine. There are numerous active oil and gas wells. The only agricultural land within 30 miles is irrigated farmland along the Pecos River, near the municipalities of Carlsbad and Loving; little, if any, dry-land farming takes place within the area.

At present, land within 10 miles of the site is used for potash-mining operations, active oil and gas wells, and grazing.

2.2.3.2 Municipal Housing and Land Use

Carlsbad

According to officials of the City of Carlsbad, between June 1977 and August 1979, Carlsbad annexed 8,544 acres of land, thereby increasing the land area within its city limits to 13,335 acres. With the addition of the annexed land, the majority of which is vacant, the total vacant land area in Carlsbad amounts to approximately 7,500 acres, which is 57% of the total municipal acreage.

Land-use patterns inside the city limits are currently changing. Much of the city is being rezoned, with the outcome of the rezoning in doubt. Until rezoning is settled, it is not possible to accurately predict either the location or the total amount of land to be available for future residential, commercial, or industrial development.

Figure 2-4. Land ownership within 30 miles of the WIPP site.

Figure 2-5. Land use within 30 miles of the WIPP site.

Information from the city of Carlsbad shows that, during the period 1970-1977, new housing units were added to the city's housing stock at a rate of approximately 160 per year. Actual construction averaged approximately 180 units per year for that period, with approximately 25 of the new construction units replacing structures that were classified as "demolitions." Concurrently, the vacancy rate decreased from approximately 3% in 1970 to 1% by 1977. In 1978 construction activity increased, with 257 new housing units added to the housing stock. However, demolitions and population growth maintained the vacancy rate at an average of approximately 1%. For the vacancy rate to have reattained 3%, generally accepted as the desirable vacancy rate that permits orderly population and community growth, construction of 153 additional housing units would have been necessary in 1978.

By mid-1979, the Carlsbad housing stock was estimated to be approximately 10,198 units (Table 2-14). The most recent information from the city of Carlsbad (1979) indicates that the vacancy rate has remained at a level of approximately 1%.

Table 2-14. Housing Stock: Carlsbad (1979)

Type	Total	Occupied	Unoccupied
All units	10,198 ^a	10,045 ^b	153
Single-family units	8,166 ^a	8,044 ^c	122
Multifamily units	1,101 ^a	1,084 ^c	17
Mobile homes	931 ^d	917 ^c	14

^aBased on data from the U.S. Department of Commerce, 1970 Census of Housing (USDC, 1970b), and subsequent building permit and demolition data.

^bBased on population and household-size estimates prepared for this report.

^cOccupancy rates assumed identical for all housing types.

^dDatum from Adcock (1979).

Temporary housing is available on a seasonal basis in Carlsbad's 20 motels and hotels, which have a total of about 1,100 rooms. Between Memorial Day and Labor Day occupancy rates are about 100%. Nonsummer occupancy rates on weekends are as low as 50% in some motels but 95 to 100% on weekdays (Carlsbad Department of Development, 1977-1979).

The Federal Housing Authority's Section 8 program provides rent and utility assistance (up to 75%) to qualified renters. Generally, to qualify, a person must be more than 62 years old, disabled, or handicapped and have

an income of less than \$8,500 (single-person limit). Currently (November 1979), Carlsbad has 91 program participants and approximately 25 to 30 applicants for the program (personal communication from J. Haut, U.S. Department of Housing and Urban Development, Roswell, New Mexico, 1979).

Hobbs

According to current information from the city of Hobbs (1979), the total land area inside the Hobbs city limits, including the Hobbs Industrial Air Park (HIAP), is about 14,830 acres. Not including the HIAP, approximately 1,070 acres are vacant and available for residential, commercial, or industrial development. Almost the entire area of the HIAP is vacant at present, providing an additional 3,500 acres for industrial development. Since Hobbs has no zoning ordinance, there are no figures on the total amount of land available for specific types of use.

From 1970 to 1977, new housing units were added to the Hobbs housing stock at a rate of about 215 per year. Actual construction averaged 254 units per year for the period, with about 40 units per year replacing condemned or removed structures. This relatively low rate of addition to the housing stock caused the vacancy rate to decline from nearly 9% in 1970 to just over 1% in 1975. In 1976 and 1977 construction activity increased, with 414 new housing units added in 1976 and 611 units in 1977. Vacancy rates increased to about 2% because of the recent construction activity. At the end of 1977, the housing stock in Hobbs was estimated at 10,879 units. The year 1978 saw a continuation of above average housing construction, with 466 new units added. However, demolitions and population growth maintained the vacancy rate at an average of approximately 2%. If a vacancy rate of 3% were to have been reattained, construction of 114 additional housing units would have been necessary in 1978.

At the end of 1978, the Hobbs housing stock was estimated to be approximately 11,345 units (Table 2-15). The most recent information from the city of Hobbs (1979) indicates that the vacancy rate has remained at a level of approximately 2%.

Temporary housing in Hobbs is available in 11 motels with 482 rooms. Seasonal occupancy patterns are very similar to those for Carlsbad. On a year-round basis, occupancy averages 84%, with the Memorial Day to Labor Day rate at 95% or higher. Nonsummer occupancy is lower than summer occupancy on the average, but weeknight occupancy is very high even in nonsummer months.

The Federal Housing Authority's Section 8 Program currently provides rent and utility assistance to 39 qualified renters in Hobbs, and there are approximately five applicants on the waiting list (personal communication from J. Haut, U.S. Department of Housing and Urban Development, Roswell, New Mexico, 1979).

Table 2-15. Housing Stock: Hobbs, (1979)^a

Type	Total	Occupied	Unoccupied
All units	11,345	11,119	226
Single-family units	8,677	8,503	174
Multifamily units	1,295	1,269	26
Mobile homes	1,373	1,345	28

^aData from the city of Hobbs, 1979. Occupancy based on a vacancy-rate estimate in this housing count, with vacancy rates assumed to be identical for all housing types.

Loving

During the period 1970 through October 1979, the housing stock in Loving increased by 19.9% from 403 (USDC, 1970b) to 483 housing units (Table 2-16) (Adcock, 1979). The vacancy rate has decreased from 27.0% (109 units) in 1970 (USDC, 1970b) to 4.3% (21 units) in October 1979 (Adcock, 1979).

Table 2-16. Housing Stock: Loving (1979)^a

Type	Total	Occupied	Unoccupied
All units	483	462	21
Single-family units	410	389	21
Multifamily units	24	24	NA ^b
Mobile homes	49	49	NA ^b

^a Data from Larry Adcock and Associates (1979)
Residential, Commercial, and Service Structure Inventory.

^bNA: Not applicable.

Official information regarding the current (November 1979) quality of housing is unavailable; the most recent information is for 1974. According to the results of a 1974 housing survey conducted by the Southeastern New Mexico Economic Development District (SENM EDD), 58% of the housing units in Loving were of sound condition, 26% were deteriorating, and 16% were dilapidated.

The 1974 SENM EDD survey used the number of mobile homes in a community as a measure of the quality of housing stock; mobile homes are considered to be inferior to other types of structurally sound housing

units. Recently, the number of mobile homes in Loving has been increasing. During the period 1974-1979, mobile homes increased from the 14 units counted in the above-mentioned survey to 49 units (Adcock, 1979), an increase of 250%.

The results of the 1979 Loving structure inventory compiled by Larry Adcock and Associates show that neither the overall numbers nor the percentages of sound versus deteriorating and dilapidated housing units have changed significantly since 1974.

The Federal Housing Authority's Section 8 Program had no participants in Loving as of October 1979 (personal communication from J. Haut, U.S. Department of Housing and Urban Development, Roswell, New Mexico, 1979).

2.2.4 Community Facilities

2.2.4.1 Education

There are three public school districts in Eddy County and five in Lea County, with a combined 1978-1979 enrollment of 21,927. Three public school districts appear likely to experience impacts from the WIPP repository. Special education, adult education, and technical-vocational programs are offered through the municipal school systems in Carlsbad and Hobbs.

Three institutions of higher education are in the vicinity of the WIPP site: a branch of the New Mexico State University in Carlsbad; the New Mexico Junior College and the College of the Southwest (a small 4-year institution) in Hobbs. Eastern New Mexico University maintains a branch in Roswell, about 75 miles north of Carlsbad; its main campus is in Portales, approximately 110 miles north of Hobbs. New Mexico Military Institute is also located in Roswell. Somewhat farther from the site are New Mexico State University, with a main campus in Las Cruces and a branch in Alamogordo, and the University of Texas at El Paso.

Carlsbad

Information obtained in 1979 from the Carlsbad School District shows that the Carlsbad school system consists of 10 elementary schools, 2 junior high schools, 1 mid-high school, and 1 senior high school, with a combined enrollment of about 6,620 students. This enrollment is well below the capacity of 10,000 students. As shown in Table 2-17, the excess capacity exists at all grade levels.

Table 2-17. Enrollment: Carlsbad School District^a

Year	Grade				Total
	K-6 ^b	7-8	9-10	11-12	
ENROLLMENT CAPACITY ^c					
	4,600	1,860	1,770	1,870	10,000
ACTUAL ENROLLMENT ^d					
1977-1978	3,178	1,390	1,132	1,037	6,737
1978-1979	3,501	982	1,178	960	6,621

^aData from the Carlsbad School District (1979).

^bIncludes special education "C" and "D" kindergarten students counted as full time.

^cAssumes a capacity of 24 students per classroom.

^dCarlsbad Forty-day Average Daily Membership.

The Carlsbad school system has a complete special education program that conforms to standards set by the state of New Mexico. With approximately 455 students at present, the special education program serves mentally retarded persons between the ages of 5 and 21 and also assists children with speech and learning disabilities.

Adult education programs are provided through the public school system. These programs offer training in basic skills as well as classes leading up to the General Education Development Tests.

Technical-vocational programs are provided by both the high schools and the branch of New Mexico State University. There are also work/study and other vocational training programs for the mentally retarded.

Hobbs

The Hobbs school system currently consists of 10 elementary schools, 3 junior high schools, and 1 high school. According to information from the Hobbs School District, the total enrollment for the 1978-1979 school year was about 7,630 students (Table 2-18). This enrollment is somewhat below the estimated capacity of 8,350 students.

Table 2-18. Enrollment: Hobbs School District (1978-1979 School Year)^a

Grade			
K-6 ^b	7-9	10-12	Total
ENROLLMENT CAPACITY ^c			
4,630	1,990	1,730	8,350
ACTUAL ENROLLMENT ^d			
4,237	1,715	1,677	7,629

^aData from the Hobbs School District (1979).

^bIncludes special education "C" and "D" kindergarten students counted as full time.

^cAssumes a capacity of 24 students per classroom.

^dHobbs Forty-day Average Daily Membership.

Special education programs are offered for persons between the ages of 6 and 21. There are also programs for children in grades 1 through 6 with learning disabilities.

Adult education classes that upgrade basic skills to the eighth-grade level are offered. Classes preparing students for the General Education Development Tests are also provided.

Technical-vocational programs are provided by the high school and the New Mexico Junior College. There is also a special vocational rehabilitation program for the mentally retarded.

Loving

The Loving school system currently consists of two schools--one elementary and one junior high school. According to information obtained in 1979 from the Loving School District, some 120 high-school-age students from the Loving district currently attend classes in Carlsbad schools. The district's combined enrollment totals 342 full-time students (Table 2-19). The enrollment is well below the school-district capacity of approximately 430 pupils. This excess capacity exists at all levels except the fourth and sixth grades.

Table 2-19. Enrollment: Loving School District (1978-1979 School Year)^a

K ^b	Grade		Total
	1-6	7-9	
	ENROLLMENT CAPACITY ^c		
48	240	140	428
	ACTUAL ENROLLMENT ^d		
35	188	119	342

^aData from the Loving School District (1979).

^bIncludes special education "C" and "D" kindergarten students counted as full time.

^cAssumes a capacity of 24 students per classroom.

^dLoving Forty-day Average Daily Membership.

2.2.4.2 Municipal water systems

Carlsbad

According to information provided by city officials in 1979, Carlsbad currently obtains its water from a well field in the Capitan Reef (Figure 2-6) and through a pipeline from the Double Eagle System to the northeast of the city. There are eight wells presently pumping water from the Capitan field and 22 wells in the Double Eagle field. In addition, there are three wells within the city limits that are not used because the water under Carlsbad is of lower quality than water outside the city limits.

The city has rights to 9,200 acre-feet per year in the Capitan Reef and 7,648 acre-feet per year in the Double Eagle field. In addition, Carlsbad has rights to 10,640 acre-feet per year from a well field north of the city in the Ogallala Formation, giving the city total rights to over 27,000 acre-feet per year.

Current (1979) water use averages about 5.8 million gallons per day (mgd) in Carlsbad. Peak use is about 16 mgd, well within the current 26.4-mgd capacity of the delivery system.

Figure 2-6. Municipal facilities, water system, and sewage-treatment plants, Carlsbad.

Hobbs

Information obtained in 1979 from city officials shows that Hobbs currently has rights to 18,888 acre-feet of water per year from ground-water sources (primarily inside the city limits) in the Ogallala Formation. In addition, it has an allocation of 15,340 acre-feet per year from the proposed Eastern New Mexico Water Supply System, which would deliver water from the Ute Reservoir to 10 communities in eastern New Mexico. The status of this project is currently very uncertain, and it is not known when, if ever, the delivery of water from this system to Hobbs will begin.

Municipal water is supplied from 28 wells located in and around the city (Figure 2-7). The current potential yield of the wells is about 14 mgd.

Average water use is currently about 12 mgd. Peak daily use, normally about double the average daily rate in this area, is limited by the capacity of the delivery-and-storage system to just over 14 mgd. Thus, although the total water rights in the Ogallala Formation are adequate for current demands (about 7,050 acre-feet per year), there is a need for additional wells and storage-and-delivery facilities. The recent completion of four additional wells will partially alleviate the existing water systems's limitations.

Loving

Loving currently obtains its water supply from four wells located about seven miles from the community. The village purchased the system in 1960 from a private firm. The system contains one 125,000-gallon and one 150,000-gallon storage tank. Water from this system is also supplied to the community of Malaga, which is south of Loving (communication from Molzen-Corbin and Associates, Albuquerque, New Mexico, 1979).

The available water rights of 800 acre-feet per year are sufficient to meet the current and future needs of the community, considering its relatively slow growth (NMSE, 1979).

The current average use is approximately 91 million gallons per year, or 258,000 gallons per day. The peak use of approximately 500,000 gallons per day exceeds the present system's delivery and storage capacity of 250,000 gallons per day (data from Molzen-Corbin and Associates, Albuquerque, New Mexico, 1979).

To meet the current water demand, the existing 6 and 8-inch pipeline is scheduled to be replaced by a 10-inch pipeline. In addition, a new 500,000-gallon storage facility is to be constructed at the well site. Bids for the water-system improvements were opened in October 1979.

Figure 2-7. Municipal facilities, water system, and sewage-treatment plant, Hobbs.

2.2.4.3 Municipal Wastewater Systems*

Carlsbad

The Carlsbad municipal sewage-treatment plant, inadequate for current needs, is being expanded and upgraded, with construction expected to be completed by September 1981. On completion, the plant will have a design capacity adequate to serve 50,000 people. Effluent waste will be used to irrigate a 700-acre farm owned by the city.

Sewage-collection facilities provide service to the entire city (Figure 2-6). Residential areas outside city limits use septic systems. About 25 to 30% of the developing areas in the vicinity of the city are currently not suited to the use of conventional percolation septic systems and must use the somewhat more expensive evapotranspiration septic systems.

Hobbs

The construction of a new municipal sewage-treatment plant is under way, with completion expected in early 1980. The new plant will have an initial capacity of 5 mgd and a capability to expand to 6 mgd.

There are also plans to expand and upgrade the main sewer lines in the city. Two of the three existing main trunk lines will be affected, with one being rebuilt and one being paralleled by a new bypass line. The completion of the project is expected early in 1980.

Since April 1, 1978, developing areas north of Hobbs (Figure 2-7) have been restricted by the New Mexico Environmental Improvement Division to the use of evapotranspiration septic systems because of past problems with sewage from percolation systems seeping into local water supplies. The use of the evapotranspiration systems is expected to prevent further problems with residential sewage in areas not connected to the Hobbs municipal sewage system.

Loving

The municipal sewage treatment plant built in 1950 does not meet current effluent standards set by the New Mexico Water Quality Commission. Consequently, the village has received a federal grant to construct a new treatment facility. At present, the appropriated funds (\$300,000) equal approximately 50% of the design and construction costs for an adequate plant. Loving is still seeking additional funding to start the project (information from Molzen-Corbin and Associates, Albuquerque, New Mexico, 1979).

*Data obtained from the city of Carlsbad (1979), the city of Hobbs (1979), and the New Mexico Environmental Improvement Division (1978), unless otherwise stated.

The treatment plant now in use is a primary system and has a rated capacity of 0.15 mgd. According to the Southeastern New Mexico Economic Development District, it is experiencing a demand of 55 to 60%. The sewage facility serves approximately 1,600 people (Adcock, 1979).

Sewage-collection facilities provide service to the majority of Loving's residents. The only exception is the extreme eastern section of Cedar Street (Figure 2-8). Because this area's elevation is lower than that of the current system, a lift station would be required to provide collection services. The residents of the area now use individual septic tanks.

2.2.4.4 Electric Service*

Carlsbad and Loving

Eddy County obtains electricity from the Southwestern Public Service Company (SPSC). For SPSC's service area which includes Carlsbad, Loving, and the rural areas between them, SPSC had 12,536 customers in April 1979. Of this total, 11,247 were residential and 1,289 were commercial or industrial customers. Although the residential customers were numerically the largest class of electricity users, they accounted for only 22% of electricity demand; the commercial, industrial, and miscellaneous customers accounted for the remaining 78%. Approximately 75% of the power is currently generated by natural-gas plants and 25% by coal-fired plants. Another coal-fired plant will become operational in June 1980, changing the ratio of power-generation sources to 65% for natural gas and 35% for coal. In addition, it is expected that one coal-fired plant will be completed in each of the years 1982 and 1984; the effects of the two additional coal-fired plants on the ratio of natural-gas to coal-fired generation cannot now be ascertained.

Hobbs

New Mexico Electric Service Company supplies electricity to Hobbs. In September 1979, New Mexico Electric served 13,607 customers in the area within the Hobbs School District boundaries. Of this total, 11,548 were residential, 1,747 were commercial, and 312 were industrial customers. Although the residential customers were numerically the largest class of electricity users, they accounted for only 16% of electricity demand; the commercial and industrial customers accounted for 15 and 69%, respectively, of electricity demand. This electricity is generated by a single natural-gas plant. The company is studying the feasibility of using coal, but no decision on a conversion has been made.

*Data obtained in 1979 from the Southwestern Public Service Company (Carlsbad and Loving) and the New Mexico Electric Service Company (Hobbs).

Figure 2-8. Municipal facilities, water system, and sewage-treatment plant , Loving.

2.2.4.5 Natural-gas Service*

Carlsbad

In January 1979, Gas Company of New Mexico was supplying natural gas to 9,816 customer accounts in the Carlsbad area (8,845 residential, 856 commercial, 17 industrial, and 98 miscellaneous). The residential, commercial, industrial, and miscellaneous users accounted for 16, 6, 76, and 2%, respectively, of the natural-gas demand in Carlsbad.

Hobbs

In January 1979, Hobbs Gas Company was supplying natural gas to 10,712 customer accounts in the Hobbs area (9,415 residential, 1,245 commercial, 6 industrial, and 46 miscellaneous). The residential, commercial, industrial, and miscellaneous users accounted for 64, 27, 2, and 7%, respectively, of the natural-gas demand in Hobbs.

Loving

In January 1979, Gas Company of New Mexico was supplying natural gas to 453 customers in the Loving area (395 residential, 34 commercial, 1 industrial, and 23 miscellaneous). The residential, commercial, industrial, and miscellaneous users accounted for 56, 7, 28, and 9%, respectively, of the natural-gas demand in Loving.

2.2.4.6 Fire Protection**

Carlsbad and Eddy County

The Carlsbad Fire Department has 30 full-time employees, or about 1.04 per 1,000 people, operating out of the main fire station and four substations (Figure 2-6). Major equipment includes two 1,500-gpm pumpers, one 1,000-gpm pumper, three 750-gpm pumpers, and a dry-chemical truck at the airport. The primary service area for the department is the city, but occasional trips are made outside the city limits to assist the all-volunteer Eddy County Fire Department. These trips are made on the basis of a verbal mutual-aid agreement between the city and the county.

Hobbs and Lea County

The Hobbs Fire Department currently has 44 full-time employees, including two dispatchers, or about 1.35 per 1,000 people. There are two fire stations

*Data obtained in 1979 from the Gas Company of New Mexico (Carlsbad and Loving) and the Hobbs Gas Company.

**Data obtained in 1979 from the cities of Carlsbad, Hobbs, and Loving unless otherwise stated.

(Figure 2-7) and seven fire trucks. Approximately one-third of the department's calls are outside the city limits to assist the all-volunteer Lea County Fire Department.

Loving

The Loving Fire Department currently is an all-volunteer organization composed of 25 members. The department operates out of one station (Figure 2-8) and is equipped with three pumps and one emergency vehicle.

The general service area for the department is the village of Loving, but service to areas adjacent to the village limits is also provided.

2.2.4.7 Law Enforcement

Carlsbad and Eddy County

The Carlsbad Police Department has 48 full-time employees, or about 1.7 per 1000 people. The primary area served by the department is the city, but officers cross the city limits to assist New Mexico State Police or Eddy County Sheriff's officers on request. City police also have Eddy County Sheriff's commissions to facilitate their activities outside the city limits.

The Eddy County Sheriff's Office has about 23 full-time employees. In addition, as discussed above, the office can call on Carlsbad police officers for assistance if needed (data from the Eddy County Sheriff's Office, 1979).

Eddy County had a total of 89 law enforcement officers (State Police, Sheriff's Office, and Police Department) in 1978, or 1.9 per 1,000 people (Adcock, 1979).

Hobbs and Lea County

The Hobbs Police Department has 81 full-time employees, or about 2.5 per 1,000 people. Moreover, Hobbs has developed a program (Operation Saturation) in which off-duty police officers use marked patrol cars. The effect of the program is to increase the apparent size of the department by making police officers visible, whether on or off duty. The police department serves the city primarily, with only occasional calls outside the city limits.

The Lea County Sheriff's Office has approximately 33 full-time employees. In addition, the department can call on Hobbs police officers for assistance if needed.

Lea County had 124 officers (State Police, Sheriff's Office, and Police Department) in 1978, or approximately 2 per 1,000 people.

Loving

The Loving Police Department has two full-time employees and three vehicles. The department services the village, with only occasional calls outside the village limits.

2.2.4.8 Health Care*

Carlsbad and Eddy County

The Guadalupe Medical Center in Carlsbad is the principal short-term hospital in Eddy County. It opened in late 1977 and has 134 beds. There is also the 34-bed Artesia General Hospital. On the basis of mid-1978 Eddy County population estimates, the 168-bed county total amounts to 3.6 per 1,000 population. This is below the national average of 4.0 beds per 1,000, but it is representative of the state of New Mexico's average of 3.5 per 1,000. Nonetheless, the mid-1979 Guadalupe Medical Center occupancy rate of 65% is below the federal standard of 80% proposed for all nonfederal, general, short-term hospitals (Bennett, 1977). Additional medical facilities available in the area are indicated in Table 2-20.

Table 2-20. Medical Facilities: Eddy and Lea Counties^a

Facility	Carlsbad	Eddy ^b	Hobbs	Lea ^c
Short-term hospitals	1	2	1	2
Hospital beds (plus bassinets)	134 (18)	168 (NA)	180 (20)	203 (20)
Nursing homes	2	2	2	3
Intermediate-care facilities and home health agencies	NA ^d	3	NA	3
Clinics (including mental health)	NA	6	NA	4
Primary-care clinics	0	1	1	1
Pharmacies	14	17	8	18

^aData from the New Mexico Health Resources Registry, Guadalupe Medical Center, Lea Regional Medical Center, and Adcock (1979).

^bIncludes Carlsbad.

^cIncludes Hobbs.

^dNot available

There are 35 physicians in Eddy County, 30 of whom use the facilities of the Guadalupe Medical Center. Twenty-one of the county's physicians provide primary care, or about 0.5 per 1,200 population. Although there are no generally accepted standards for primary care physician-to-population ratios, the Eddy County ratio of 0.5 is only half the suggested level of 1.0 per

*Data obtained in 1979 from the Guadalupe Medical Center (Carlsbad and Eddy County), the Lea Regional Medical Center (Hobbs and Lea County), and the cities of Carlsbad and Loving, unless otherwise stated.

1,200 (Bennett, 1977). Eddy County was classified as a medically underserved area in 1976 by the Secretary of Health, Education, and Welfare for purposes of determining eligibility for Health Maintenance Organization funding (Bennett, 1977). In addition, there are 17 dentists in Eddy County (NMHRR, 1979).

Emergency medical services are provided by a Dallas, Texas, company that has a contract with the Guadalupe Medical Center. The emergency services operate a 24-hour emergency room staffed by three physicians; one of these three emergency treatment specialists is in attendance at all times.

Ambulance service is provided by the Carlsbad Fire Department. There are currently four vehicles in use, and a fifth has been ordered. Ambulance service normally covers an area within about 30 miles of the city. Each ambulance is staffed by two emergency medical technicians (EMTs). The Fire Department has 3 full-time EMTs on the staff, and 25 additional paid volunteer (part-time) EMTs are available.

Hobbs and Lea County

Lea County has two short-term hospitals: the Lea Regional Medical Center in Hobbs, with 180 beds, and the Community General Hospital in Jal, with 23 beds. Population estimates for mid-1978 show that Lea County has 3.6 hospital beds per 1,000 population, which is less than the national average of 4.0 beds per 1,000 and more than the New Mexico average of 3.5 per 1,000. Nevertheless, the mid-1979 Lea Regional Medical Center occupancy rate of 65% is below the federal standard of 80% proposed for all nonfederal, general, short-term hospitals.

Additional medical facilities in Lea County (Table 2-20) include five clinics, one of which, located in Hobbs, provides primary care. In addition, there are three nursing homes and three intermediate-care and home health agencies (NMHRR, 1979).

There are 33 physicians in Lea County, 25 of whom are located in Hobbs. Thirty of the physicians provide primary care, or 0.6 per 1,200 people. This is considerably less than the level suggested by Bennett (1977) of 1.0 per 1,200. Partly as a result of this low ratio of primary-care physicians to the population, Lea County was classified as a medically underserved area in 1976 by the Secretary of Health, Education, and Welfare for purposes of determining eligibility for Health Maintenance Organization funding (Bennett, 1977). In addition, there are 12 dentists in Lea County (NMHRR, 1979).

Emergency medical services are provided by a Dallas, Texas, company that has a contract with the Lea Regional Medical Center. The emergency room operates on a 24-hour basis; at all times, an emergency treatment specialist is in attendance.

Ambulance service is provided by the Hobbs Fire Department, which currently operates four ambulances. The ambulance service area extends to Lovington on the north, the county line on the west, into Texas on the east, and about 15 miles to the south. Each ambulance carries two EMTs on all

calls. The Hobbs Fire Department employs 40 EMTs full time (i.e., most fire-department personnel are qualified as EMTs). The department also employs one EMT instructor.

Loving

The community of Loving has only one medical facility, El Centro Rural de Salud. It opened in 1977 and has a staff of six. Federally funded, the health center specializes in primary medical care. Services at the clinic include prenatal care, family planning, counseling, and medical advice and referral.

Short-term hospitalization is available in Carlsbad at the Guadalupe Medical Center. Ambulance service is available from either the Loving or the Carlsbad Fire Department.

2.2.4.9 Traffic and Transportation: Regional

Pipeline Transportation

According to information obtained in 1979 from the El Paso Natural Gas Company, a 12.75-inch natural-gas pipeline passes through the site about a mile north of its center, running in an east-west direction. This pipeline was built in the 1940s. Approximately 8 to 9 miles south of the site is a 26-inch El Paso Natural Gas line that also runs east-west.

Air Transportation

The commercial airport nearest to the site is the Cavern City Air Terminal, about 30 miles to the west. To the east-northeast lies the Hobbs-Lea County Airport, about 35 miles away. There are no landing strips within 10 miles of the site. The site, however, is traversed by commercial air traffic between Carlsbad and Hobbs.

Highway Transportation

Figure 2-9 shows the average daily traffic flow in the vicinity of the site (the annual average daily traffic flow at selected control locations is shown in Figures 2-10, 2-11, and 2-12). Data for the overall flow of vehicles indicate sufficient capacity for the highway: capacity ratings vary from 20 to 29 on a scale of 30 on the section of road between Carlsbad and Hobbs.

Segments of NM 31 and NM 128 lie within 10 miles of the site. U.S. Highway 62-180 runs east to west about 10 miles north of the site. U.S. Highway 62-180, part of the Federal Aid Primary System, is a four-lane divided highway from Carlsbad to the Lea County line. For 17 miles east of the Lea County line, the highway has two lanes; for the rest of the distance into Hobbs, it is again a divided four-lane highway.

Figure 2-9. Average daily traffic flow in the area of the WIPP site, 1978.

RD SECT ¹ LOC #	FLOW ² DIR	SECT ³ LENG	SURF ⁴ TYPE	WIDTH IN FEET		ADT ⁷	FDNT ⁸	CONDITION RATING			CAP ¹²	OVAL ¹³ RATG
				PAVT ⁵	RDWY ⁶			SUR ⁹	DR ¹⁰	SAF ¹¹		
1	N	7.7	Bit	20	22	663	10	11	09	02	27	56
2	N	8.7	Bit	20	20	250	10	11	07	01	29	63
3	N	3.4	Bit	18	20	272	10	10	05	02	29	60
4	N	2.9	Bit	24	28	487	10	09	10	02	29	60

Source: Ratings for Highway Improvements, Rural Federal-Aid Secondary System, 1976, New Mexico State Highway Department, Planning and Programming Division, in cooperation with U.S. Department of Transportation, Federal Highway Administration.

Figure 2-10. Average daily traffic flow on NM 31, 1977.

RD SECT ¹ LOC #	FLOW ² DIR	SECT ³ LENG	SURF ⁴ TYPE	WIDTH IN FEET		ADT ⁷	FDNT ⁸	CONDITION RATING			CAP ¹²	OVAL ¹³ RATG
				PAVT ⁵	RDWY ⁶			SUR ⁹	DR ¹⁰	SAF ¹¹		
1	E	9.1	Bit	20	22	237	10	10	06	01	29	62
2	E	9.8	Bit	22	22	168	10	12	07	02	29	68
3	E	9.5	Bit	22	22	271	10	11	06	02	29	62

Source: Ratings for Highway Improvements, Rural Federal-Aid Secondary System, 1976, New Mexico State Highway Department, Planning and Programming Division, in cooperation with U.S. Department of Transportation, Federal Highway Administration.

Figure 2-11. Road conditions and traffic flow on NM 128, selected sections.

RD SECT ¹ LOC #	FLOW ² DIR	SECT ³ LENG	SURF ⁴ TYPE	WIDTH IN FEET		ADT ⁷	FDNT ⁸	CONDITION RATING			CAP ¹²	OVAL ¹³ RATG
				PAVT ⁵	RDWY ⁶			SUR ⁹	DR ¹⁰	SAF ¹¹		
9	E	2.3	Bit	24	36	2,409	10	15	10	03	28	63
9	W	2.3	Bit	22	28	2,409	10	12	10	03	28	59
10	E	4.1	Bit	24	40	2,123	10	24	10	04	28	75
10	W	4.1	Bit	20	26	2,123	10	16	10	02	28	64
11	E	5.3	Bit	24	40	2,031	10	27	10	20	28	95
11	W	5.3	Bit	20	30	2,031	10	16	10	04	28	67
12	E	1.4	Bit	24	40	1,854	10	27	10	20	28	95
12	W	1.4	Bit	20	26	1,854	10	16	09	03	29	66
13	0	8.4	Bit	22	30	1,881	10	12	09	03	20	53

Source: Ratings for Highway Improvements, Rural Federal-Aid Primary System, Interstate System Included, 1977, New Mexico State Highway Department in cooperation with U.S. Department of Transportation, Federal Highway Administration.

Figure 2-12. Road conditions and traffic flow on US 62-180, selected sections.

Explanation of Terms for Figures 2-10, 2-11, and 2-12

1. RD SECT, LOC #: Number on route map identifying the subject location.
2. FLOW DIR: Traffic flow or direction. 0 - Undivided highways; N - Northbound; S - Southbound; E - Eastbound; W - Westbound; 5 - Other; and 6 - Other where Average Highway Speed is less than design speed.
3. SECT LENG: Length of the rating section in miles and tenths.
4. SURF TYPE: Existing surface types are indicated as follows: UN - Unimproved; BL - Bladed; G&D - Graded and drained; GR - Gravel; BIT - Bituminous; CON - Portland Cement Concrete.
5. WIDTH IN FEET/PAVT: Width of concrete or bituminous surface recorded in an even number of feet.
6. WIDTH IN FEET/RDWY: The distance between outside shoulder lines.
7. ADT: Average daily traffic, the average number of vehicles passing a given point on the highway in a typical 24-hour period of up to 72 hours; count in both directions on the divided highways.
8. FDNT: Foundation rating - 10 points. Foundation can be rated only 10 for adequacy or 0 for inadequacy. A rating of "0" is given to sections if any of the following conditions exist: 1 - Travelled way less than 18' wide; 2 - Lack of adequate and uniform cross section, including side ditches; 3 - Paved surface indicating failure which could not be corrected by the addition of a few inches of surface material.
9. SURF: Surface. The surface receives a rating on the scale of 0 - 30. If surface is in relatively good condition but showing first signs of deterioration, it receives a rating of 15. More advanced decay, while still in fair, usable condition, is rated between 10 and 15. Pavement in a condition justifying replacement is assigned a rating of 10. Increasingly poor conditions to the point of complete deterioration are rated 10-0.
10. DR: Drainage - 10 points. Lack or inadequacy of drainage facilities reduces the total of 10 points allotted for completely adequate drainage. The amount of reduction is proportional to the relative lengths of the deficient segment to the total rating section and the degree of the deficiency.
11. SAF: Safety - 20 points. The other conditions which are rated also involve features of safety; however, this rating item is concerned with certain conditions as follows: 1 - Stopping sight distance less than permitted by the design speed; 2 - Horizontal curves sharper than permitted by the design speed; 3 - Bridges narrower than the travelled way width; and 4 - Dips.
12. CAP: Capacity. A rating between 0 and 30 is assigned to represent the capacity characteristic of the rating section. From a rating of 30, indicating full capability to carry the actual existing traffic load (ADT), to a rating of 0 to 10 indicating a deficient section, the decreasing numerical value indicates the increasing presence of significant factors contributing to the decline of the traffic-carrying capability of the roadway.
13. OVAL RATG: Overall rating. This overall rating is an adjusted indicator representing a weighted average of the previous five categories. The formula used to arrive at this adjusted rating from the total rating takes into account the average traffic volume for the system of which it is a part.

New Mexico 31, a two-lane road with a bituminous surface, runs north to south about 10 miles west of the site. There is little or no shoulder on certain portions of the highway. According to the New Mexico State Highway Department (1979), one section within 10 miles of the site has an overall pavement width of 18 feet and a total roadway width of 20 feet.

New Mexico 128, running east to west, traverses the southern portion of the 10-mile radius. This state-maintained two-lane bituminous-surface highway is part of the Rural Federal Aid Secondary System. Pavement widths vary between 20 and 22 feet for sections within the 10-mile radius of the site, and the roadbed is at least 22 feet wide. From the intersection of NM 31 and NM 128 to the present access road to the site, the highway traverses several small salt lakes or ponds; here there is virtually no shoulder, and in some areas there is an abrupt drop of 2 to 3 feet from the paved surface level to the pond or lakebed level. Several inspection trips revealed a significant amount of maintenance along these segments of NM 128 and along similar segments of NM 31. Surface and safety ratings in Figures 2-10 and 2-11 show significant deficiencies along certain portions of N.M. 128 and 31. It is suspected that these low ratings are caused partially by the presence of low areas that collect salt water and turn into salt lakes or ponds (Adcock, 1979).

Railroad Transportation

In the two-county area, two companies operate rail systems: the Atchison, Topeka and Santa Fe, and the Texas-New Mexico Railroad. The Atchison, Topeka and Santa Fe enters New Mexico from the south, running parallel to U.S. 285. It connects the communities of Loving, Carlsbad, and Artesia in Eddy County and proceeds north to connect with the Atchison, Topeka and Santa Fe main line at Clovis, New Mexico. Spur lines to the potash-mining area have also been constructed.

The spur line to the Duval Nash Draw mine offers the closest access to the WIPP site. The proposed extension of this spur will connect the site with the Atchison, Topeka and Santa Fe line. The Texas-New Mexico line enters at the southeast corner of Lea County and parallels NM 18, connecting the communities of Jal, Eunice, Hobbs, and Lovington. The line ends just north of Lovington.

2.2.4.10 Traffic and Transportation: Municipal

Carlsbad

Current traffic-flow levels are well within the existing capacity of the street system. Inspection of the street system shows few unpaved streets within the city limits. The condition of the street system appears to be good and shows adequate maintenance.

Commercial air service is provided by three airlines: Air Midwest, Crown Aviation, and Permian Airways. Each airline company has two daily scheduled

arrivals and departures. Commercial air service is provided for transportation between Carlsbad, Hobbs, and Albuquerque, New Mexico, and Midland, Odessa, and El Paso, Texas.

The Santa Fe Railway provides the area with freight service. Piggyback service is available, and daily switching service is sustained.

Three interstate motor-freight carriers (Apex Freight Lines, Sun Freightways, and Sundance Transportation) serve Carlsbad. Each freight carrier company has terminal facilities in Carlsbad.

Intrastate and interstate bus transportation is available through the New Mexico Transportation Company, Inc., an affiliate of Greyhound Bus Lines. A private carrier provides mass transportation to the commercial mining operations. Currently, there are 28 round trips per day to the mining sites in the Carlsbad area. There are no public transit operations in Carlsbad other than a taxicab company that operates four vehicles (Adcock, 1979).

Hobbs

Current traffic-flow levels are well within the existing capacity of the street system. Inspection of the street system shows few unpaved streets within the city limits. The condition of the street system appears to be good and shows adequate maintenance.

The Hobbs area is served by the Hobbs-Lea County Airport, 3.2 miles west of Hobbs on a paved four-lane highway. The Federal Aviation Administration maintains a control tower and provides air and ground communications. The longest runway at this municipal-county airport is 7,400 feet.

At present, three commercial carriers provide air service to Hobbs: Air Midwest, Crown Aviation, and Permian Airways. Air Midwest has six, Crown has three, and Permian has two daily arrivals and departures. These carriers give Hobbs connecting service with Albuquerque and Carlsbad, New Mexico and Lubbock, Midland, and El Paso, Texas.

Hobbs is served by the Texas-New Mexico Railroad, a subsidiary of the Texas and Pacific Railway. This railroad provides daily freight service to the Hobbs area and operates piggyback service from Lubbock, Texas.

Six motor-freight carriers serving the Hobbs area move freight on both an interstate and an intrastate basis: APEX Freight Lines, C-B Motor Freight, Illinois-California Express, OEA Express, Texas and Pacific Motor Freight, and Yellow Freight Systems, Inc. In addition, several trucking firms provide specialized or custom hauling of heavy equipment. United Parcel Service serves the Hobbs area for the shipment of small packages and envelopes. Bus service is provided by Texas-New Mexico and Oklahoma Coaches, Inc., with nine arrivals and departures daily. There are no public-transit facilities in Hobbs other than two taxicab companies operating a total of five vehicles.

Loving

Traffic-flow levels within Loving are well within the existing capacity of the street system. According to information obtained in 1979 from the village of Loving, no unpaved streets inside the corporate limits were left after the paving construction completed by the New Mexico State Highway Department in 1978. Traffic flow data published by the New Mexico State Highway Department are for urban areas of 5,000 or more population. Therefore, no Loving traffic flow information is available to the public.

Air transportation for the village is available at the Cavern City Municipal Airport in Carlsbad.

The Santa Fe Railroad, which passes directly through Loving, offers piggyback services in Carlsbad for area residents. The New Mexico Transportation Company (Greyhound Bus Lines) provides six scheduled departures daily. Three of these proceed north to Carlsbad, while three continue south to Pecos, Texas. Motor-freight service is available in Carlsbad. Local bus or taxi service is not available.

Loving has no public-transit facilities. However, the Eddy County Community Action Corporation operates a low-income transportation service. The Carlsbad Association for Retarded Citizens Farm also provides transportation for its Loving clients.

2.2.4.11 Communications Services and Facilities

Information on communications services and facilities was obtained in 1979 from the General Telephone Company of the Southwest, which serves Carlsbad, Loving, and Hobbs.

Carlsbad

In September 1979, the General Telephone Company of the Southwest had 12,302 main stations in the Carlsbad area. Of this total, 10,069 were residential customers and 1,811 were business customers. The remaining 422 main stations include mobile services, pay stations, rural services, and four-party business services.

Hobbs

In September 1979, 10,688 main stations were in service. Of this total, 7,403 were residential customers, 3,200 were business customers, and 85 were mobile business customers.

Loving

In September 1979, 539 main stations were in service, with 476 residential and 52 business customers. The remaining 11 main stations included four-party business, mobile services, and rural services.

2.2.4.12 Recreation

Regional Recreation

The State Comprehensive Outdoor Recreation Plan (SCORP) produced in 1976 lists a variety of popular activities in the two-county area. The 10 most popular activities, in decreasing order of popularity, are park visits, picnicking, attending sports events, bicycling, walking for pleasure, sightseeing, swimming in pools, fishing, tennis, and camping.

The many recreation facilities shown in Figure 2-13 meet the demand for these activities. Primary among these facilities are the Lincoln National Forest in the Guadalupe Mountains, the Presidents' Park along the Pecos River in the City of Carlsbad, the Carlsbad Caverns National Park, the Living Desert State Park, and several small fishing lakes. New Mexico Highway 137, which enters the Lincoln National Forest, has been proposed as a scenic route.

Both Eddy and Lea Counties offer a variety of opportunities for hunting birds and game.

Within 10 miles of the repository site, recreation consists of trail biking, recreational-vehicle driving, and, occasionally, bird hunting on Bureau of Land Management property. Discussions with ranchers indicate that bird hunters enter the area mainly in search of quail. Target practice and wild rabbit hunting make up the balance of activity by marksmen in this area. None of these activities occurs frequently or is organized or coordinated among local inhabitants.

Regarding the future, there are plans for developing new recreational facilities and for expanding and improving existing facilities throughout Eddy and Lea Counties.

The communities of Carlsbad, Hobbs, and Loving have plans for developing, expanding, and improving their recreational facilities (parks, tennis courts, shooting ranges, etc.) under the auspices of the Heritage Conservation and Recreation Service Grants Program of the U.S. Department of the Interior. Outside the communities, primary examples of projects with future development plans are the Living Desert State Park (State of New Mexico Parks and Recreation Department), Cottonwood Cave (U.S. Forest Service) and the McKittrick Hill Caves (U.S. Bureau of Land Management).

Municipal Recreation

Carlsbad

The city of Carlsbad has numerous recreational facilities: more than 100 playing fields; 12 tennis courts; two golf courses; one dirt autorace track; one bowling alley; one indoor and one outdoor movie theater; and one roller skating rink. There are 17 municipal parks and three other parks just outside the city. Other main attractions within the city limits include the Carlsbad Municipal Museum and the complex of Lake Carlsbad and Presidents' Park. At Lake Carlsbad there is an overnight campground as well as many

Figure 2-13. Major recreational facilities in Lea and Eddy Counties.

picnic tables. In addition, there is a senior citizens' recreation center. One KOA campground is within the city limits and one is 20 miles south at the entrance to the Carlsbad Caverns National Park at White City (Adcock, 1979).

Hobbs

The recreational facilities include 28 tennis courts, two golf courses, four swimming pools, and two bowling alleys. There are 12 municipal parks, 16.5 acres of public picnic grounds, and a variety of playground equipment at the city parks. There are various ball parks throughout the city and an active Little League. In addition, the State of New Mexico is constructing a 120-acre State Park at the HIAP just north of the city's center. Completion is expected in late 1983 or early 1984.

Just north of Hobbs, at Humble City, there is a dirt track for auto racing. To the south there is a motor cross track on the Kornegay Ranch. Each year in the Hobbs area there is a national soaring meet for sailplanes.

Other local recreational amenities include three fully enclosed handball courts and many outdoor courts. A gun club and target range with trap shooting nearby and several rodeo arenas are in the area (Adcock, 1979).

Loving

The recreational facilities available in the community of Loving are primarily located in the two municipal parks. A small children's park containing a basketball court is located near the city hall. The larger Guevara Park and Recreational Complex is in the southern part of town. Guevara Park contains two baseball fields, one tennis court, a children's playground, and a community center and picnic area. Other local recreational facilities include the junior high school gymnasium and adjacent playing fields (Adcock, 1979).

Residents of Loving have access in Carlsbad to recreational and entertainment facilities such as swimming pools, movie theaters, bowling alleys, golf courses, etc. (Adcock, 1979).

2.2.4.13 Solid-waste Management

Data on solid-waste management were obtained in 1979 from the cities of Carlsbad, Hobbs, and Loving. A summary is presented in Table 2-21.

Carlsbad

Solid-waste collection and disposal service for Carlsbad is provided by the city. The landfill site, northeast of the city (Figure 2-6), is operated in conjunction with Eddy County, which excavates the disposal trenches. The landfill site is new and has an estimated life of 30 years. The city uses 14 garbage trucks, three of which are at least five years old, to cover one commercial and seven residential routes. The service area is defined by the city limits.

Table 2-21. Solid-waste Disposal Systems^a

Item	Carlsbad	Hobbs	Loving
COLLECTION			
Responsible agency	Municipal	Private	Municipal
Residential			
Frequency	Twice per week	Twice per week	Once per week
Monthly fee	\$3.00	\$3.00	\$2.00
Number of routes	7	4	1
Commercial			
Frequency	1-6 per week	1-6 per week	None
Monthly fee	Based on time to collect	Based on container size and frequency	
Number of routes	1	2	
Number of vehicles by age			
Two years or less	7	3	0
Three to five years	4	2	0
More than five years	3	3	1
SANITARY LANDFILL			
Responsible agency	Municipal and county	Private and county	Municipal and county
Type of landfill	Trench and area	Trench	Trench and area
Size of landfill	50 acres	480 acres	50 acres
Estimated remaining life	30 years	30 years	30 years
Pieces of equipment	1 ^b	2 ^b	1 ^b
Disposal Fee	None	None	None
PERSONNEL			
Number of employees	45 ^b	25 ^b	2 ^b

^aData from the Carlsbad Sanitation Department (October 1979), Waste Control of New Mexico (Hobbs, October 1978), and the village of Loving (October 1979).

^bFigures given do not include equipment or personnel provided by the county for excavation.

Hobbs

Solid-waste collection and disposal in Hobbs is provided by a private firm using eight vehicles to cover the four residential and two commercial routes in the city. The landfill site for Hobbs, located east of the city (Figure 2-7) is operated in conjunction with Lea County. The 480-acre landfill has an estimated life of 30 years.

Loving

Solid-waste collection and disposal service for Loving is provided by the village. The landfill site, located northeast of Carlsbad, is operated in conjunction with Eddy County, which excavates the disposal trenches at the landfill sites (Figure 2-6). The site is new and has an estimated life of 30 years.

The village has one vehicle to provide this service to the area defined by the village limits shown in Figure 2-8. The vehicle is more than five years old.

2.2.5 Local Government Finances

2.2.5.1 Municipal Finances

Carlsbad

A mayor-council form of city government serves the city of Carlsbad. The mayor is elected for a two-year term; the council members are elected for four-year terms.

Revenues for Carlsbad were about \$10.4 million in fiscal year 1978-1979 (Table 2-22).

About 64% of Carlsbad revenues came from intergovernmental transfers in 1978-1979, with state gross-receipts-tax distributions accounting for most of the state transfers. In fact, gross-receipts-tax revenues constitute the largest single source of revenues for the city, accounting for more than 22% of the 1978-1979 total. More than 52% of Carlsbad's own-source revenues came from utilities in 1978-1979. On the other hand, as in most New Mexico communities, property taxes contributed very little to total revenues, about 1% of general-fund revenues in 1978-1979 and an additional 1% to general-obligation-bond revenues for the year.

In 1978-1979, Carlsbad municipal expenditures were \$10.2 million (Table 2-23). One-third of all spending in the most recent fiscal year was for personal services, 20% went to operating expenses, and 40% of the total spending was for capital improvements. Debt service accounted for 7% of the total expenditures.

Table 2-22. Municipal Revenues: Carlsbad (1978-1979)^a

Source of revenue	Actual revenues	Revenues in constant 1979 dollars ^b
OWN-SOURCE REVENUES		
Taxes	620	648
Property	213	223
Franchise	213	223
Occupation	113	118
Lodgers	80	84
Charges and miscellaneous	3,102	3,242
Licenses, permits, and fees	72	75
Charges for services		
Utilities	1,941	2,028
Solid-waste disposal	377	394
Other	222	232
Fines and forfeits	118	124
Interest on investments	27	29
Sale of bonds	150	157
Miscellaneous	194	203
INTERGOVERNMENTAL TRANSFERS		
State	2,679	2,800
Gasoline tax	188	196
Cigarette tax	117	122
Gross-receipts tax	2,302	2,406
Fire-district allocation	30	32
Auto-license distribution	2	2
Grants	40	41
Federal	942	985
Revenue sharing	224	234
Grants	718	751
Transfers, n.e.c. ^c	3,109	3,248
Total	10,453	10,922

^aBased on the Carlsbad Budget Report, June 30, 1979, the Carlsbad Municipal Quarterly Cash Report, June 30, 1979, and the Carlsbad Municipal Quarterly Report, June 30, 1978. Because of the level of detail in the sources, it was necessary to estimate the values for some revenue categories. Detail may not equal total because of rounding. Entries are thousands of dollars.

^bActual revenues adjusted by the Gross National Product Price Index. Index values for third and fourth quarters estimated.

^cNot elsewhere classified. Source of these revenues not clear.

Table 2-23. Municipal Expenditures: Carlsbad (1978-1979)^a

Service function	Actual expenditures	Expenditures in constant 1979 dollars ^b
General government	1,946	2,033
Personal services	338	354
Operating expense	375	392
Capital outlay	1,233	1,288
Public safety	1,388	1,450
Personal services	1,124	1,174
Operating expense	187	195
Capital outlay	77	80
Public works	5,435	5,679
Personal services	1,627	1,700
Operating expense	1,141	1,192
Capital outlay	2,667	2,786
Health and welfare	31	32
Personal services	29	31
Operating expense	1	1
Capital outlay	0	0
Recreation and culture	689	720
Personal services	326	341
Operating expense	287	300
Capital outlay	76	79
Debt service	732	765
General-obligation bonds	85	89
Revenue bonds	647	676
Total	10,221	10,680

^aBased on the Carlsbad Budget Report, June 30, 1979, the Carlsbad Municipal Quarterly Cash Report, June 30, 1979, and the Carlsbad Municipal Quarterly Report, June 30, 1978. Because of the level of detail in the sources, it was necessary to estimate the values of some expenditure items. Detail may not equal total because of rounding. Entries are thousands of dollars.

^bActual expenditures adjusted by the Gross National Product Price Index. Index values for third and fourth quarters estimated.

The Constitution of the state of New Mexico limits the amount of general-obligation bonded debt that a municipality may incur without voter approval to 20 mills, or \$20 per \$1000 of assessed property value. On the basis of an assessed valuation at the start of the 1978-1979 fiscal year of \$47.2 million (NMDFA, 1979a), the general-obligation bonded debt limit without voter approval for Carlsbad is \$944,000. As of June 30, 1979, Carlsbad had an outstanding general-obligation bonded debt in the amount of \$825,000 (NMDFA, 1979b).

There are no limits on the amount of bonded debt for bonds other than general-obligation bonds, although many debt issues require voter approval. The total debt outstanding for Carlsbad as of June 30, 1979, was \$6.7 million (NMDFA, 1979b).

Hobbs

Hobbs has a commission-manager form of government, with a five-member commission. Commission members are elected at large to four-year overlapping terms. A mayor is elected from the commission for a term of two years. A professional city manager is hired by the commission.

Hobbs municipal revenues were about \$13.5 million in 1978-1979 (Table 2-24). Intergovernmental transfers accounted for about 52% of 1978-1979 revenues, mostly in the form of gross-receipts-tax distributions from the state and federal grants. Utility operations provided a second major source of revenues--19% of own-source revenues and 9% of total revenues. Property taxes, including those allocated to debt service, accounted for about 2% of revenues in 1978-1979.

Expenditures for Hobbs were \$13.5 million in 1978-1979 (Table 2-25).

Spending for personal services amounted to approximately 30% of the total spending for 1978-1979. During the same period operating expenses were about 19% of the total, and capital outlays were about 47%. Debt service required an additional 4%.

With an assessed valuation of \$58 million (NMDFA, 1979a), Hobbs has a debt limit of \$1.16 million on general-obligation bonds that may be issued without voter approval. The bonded debt may exceed the limit with voter approval.

The current (June 30, 1979) general-obligation bonded debt for the city is \$4.8 million. The total outstanding bonded debt as of June 30, 1979, was \$7.97 million (NMDFA, 1979b).

Loving

Loving has a mayor-council form of government. The mayor and the five council members are elected for four-year terms.

Loving municipal revenues were \$278,500 in 1978-1979 (Table 2-26). Utility fees were the largest single revenue source, contributing 35% of total revenues in 1978-1979. Local sources accounted for about 58% of total revenues, and intergovernmental transfers provided about 42%.

Table 2-24. Municipal Revenues: Hobbs (1978-1979)^a

Source of revenue	Actual revenues	Revenues in constant 1979 dollars ^b
OWN-SOURCE REVENUES		
Taxes	997	1,042
Property	379	396
Franchise	257	269
Occupation	16	17
Gross receipts	321	336
Oil and gas	23	24
Charges and miscellaneous	7,375	7,706
Licenses, permits, and fees	41	43
Charges for services		
Utilities	1,629	1,702
Solid-waste disposal	619	647
Other	307	320
Fines and forfeits	190	198
Interest on investments	729	761
Sale of bonds	3,716	3,883
Miscellaneous	145	151
INTERGOVERNMENTAL TRANSFERS		
State	4,704	4,916
Gasoline tax	268	280
Cigarette tax	173	181
Gross-receipts tax	3,831	4,003
Fire-district allocation	24	25
Auto-license distribution	81	84
Grants	328	342
Federal	4,561	4,765
Revenue sharing	144	151
Grants	4,416	4,615
Transfers, n.e.c. ^c	4	4
Total	17,640	18,433

^aData from the Hobbs Municipal Report, June 30, 1979. Detail may not equal total because of rounding. Entries are thousands of dollars.

^bActual revenues adjusted by the Gross National Product Price Index. Index values for third and fourth quarters estimated.

^cNot elsewhere classified. Source of these transfers not clear.

Table 2-25. Municipal Expenditures: Hobbs (1978-1979)^a

Service function	Actual expenditures	Expenditures in constant 1979 dollars ^b
General government	1,644	1,718
Personal services	602	629
Operating expense	670	700
Capital outlay	373	390
Public safety	2,106	2,201
Personal services	1,912	1,998
Operating expense	123	129
Capital outlay	71	74
Public works	7,935	8,292
Personal services	846	884
Operating expense	1,339	1,399
Capital outlay	5,751	6,009
Health and welfare	540	564
Personal services	164	171
Operating expense	334	349
Capital outlay	42	44
Recreation and culture	765	799
Personal services	486	508
Operating expense	132	138
Capital outlay	147	154
Debt service	522	545
General-obligation bonds	173	181
Revenue bonds	348	364
Total	13,512	14,120

^aData from the Hobbs Municipal Report, June 30, 1979. Detail may not equal total because of rounding. Entries are thousands of dollars.

^bActual expenditures adjusted by the Gross National Product Price Index. Index values for third and fourth quarters estimated.

Table 2-26. Municipal Revenues: Loving (1978-1979)^a

Source of revenue	Actual revenues	Revenues in constant 1979 dollars ^b
OWN-SOURCE REVENUES		
Taxes	16.7	17.4
Property	2.6	2.7
Franchise	8.2	8.6
Occupation	1.8	1.8
Gross receipts (1/4%)	4.2	4.3
Charges and miscellaneous	145.8	152.4
Licenses, permits, and fees	1.3	1.4
Charges for services		
Utilities	98.3	102.7
Solid-waste disposal	14.6	15.2
Other	18.7	19.6
Fines and forfeits	9.5	9.9
Miscellaneous	3.4	3.5
INTERGOVERNMENTAL TRANSFERS		
State	41.8	43.7
Gasoline tax	5.0	5.2
Cigarette tax	2.8	3.0
Gross-receipts tax	16.6	17.3
Fire-district allocation	15.9	16.6
Grants	1.4	1.5
Federal	16.3	17.0
Revenue sharing	16.1	16.8
Grants	0.2	0.2
Local	57.9	60.5
Total	278.5	291.0

^aData from the Loving Municipal Report, June 30, 1979. Detail may not equal total because of rounding. Entries are thousands of dollars.

^bActual revenues adjusted by the Gross National Product Price Index. Index values for third and fourth quarters estimated.

Expenditures for Loving were \$285,500 in 1978-1979, or about \$7000 more than revenues (Table 2-27). Personal services and operating expenses each required about 30% of 1978-1979 expenditures, while capital outlays accounted for 32%. Debt service was 7% of spending for the year.

An assessed valuation of nearly \$1.1 million as of June 30, 1978, gave Loving a general-obligation debt limit of \$21,560. Loving has no outstanding general-obligation bonds. As of June 30, 1978, the city had \$102,000 in revenue bonds outstanding (NMDFA, 1979c).

2.2.5.2 County Finances

Eddy County

Eddy County revenues for fiscal year 1978-79 were \$5.2 million (Table 2-28). In 1978-1979, 74% of the revenues were from county sources, with taxes on oil-and-gas production and equipment contributing 24% of total revenues. Property taxes accounted for about 17% of the total for the year.

Eddy County expenditures for 1978-1979 totaled \$4.1 million (Table 2-29). General governmental functions and public works accounted for most of the spending in 1978-1979, with the former requiring more than 30% and the latter 41% of total county expenditures.

The assessed valuation of property in the county as of August 1, 1978, was \$455 million (NMDFA, 1979a). With the New Mexico limit on county general-obligation bonded debt of 4% of assessed valuation, Eddy County had a bonding limit of \$18.2 million. As of mid-1979, the county had no general-obligation bonds outstanding.

Lea County

Lea County revenues in fiscal year 1978-1979 were \$5.5 million (Table 2-30). At \$1.9 million, oil-and-gas production and equipment taxes provided 35% of county revenues in 1978-1979. Property taxes contributed an additional 16%. Overall, county sources accounted for 73% of total revenues.

Expenditures for 1978-1979 were \$4.2 million (Table 2-31). Spending on public works accounted for 45% of county expenditures in 1978-1979, and general government functions required 30%.

The total assessed valuation of property in Lea County as of August 1, 1978, was \$596 million. The general-obligation-bonded debt limit (4% of assessed valuation) was \$23.8 million in mid-1978. Lea County has no outstanding general-obligation bonds.

2.2.5.3 School-district Finances

Carlsbad

Carlsbad School District, which encompasses most of southern Eddy County, had total revenues of \$23.1 million in 1978-1979 (Table 2-32). Some 42% of

Table 2-27. Municipal Expenditures: Loving (1978-1979)^a

Service function	Actual expenditures	Expenditures in constant 1979 dollars ^b
General government	32.1	33.5
Personal services	<u>11.6</u>	<u>12.2</u>
Operating expense	20.2	21.1
Capital outlay	0.2	0.2
Public safety	70.0	73.2
Personal services	<u>30.4</u>	<u>31.8</u>
Operating expense	16.2	16.9
Capital outlay	22.6	23.6
Lease purchase payment	0.8	0.8
Public works	148.7	155.4
Personal services	<u>40.5</u>	<u>42.3</u>
Operating expense	45.4	47.4
Capital outlay	62.8	65.6
Health and welfare	5.3	5.6
Personal services	<u>4.4</u>	<u>4.6</u>
Operating expense	0	0
Capital outlay	0.9	1.0
Recreation and culture	9.8	10.2
Personal services	<u>0.2</u>	<u>0.2</u>
Operating expense	3.6	3.8
Capital outlay	6.0	6.2
Debt service	19.7	20.6
General-obligation bonds	<u>0</u>	<u>0</u>
Revenue bonds	<u>19.7</u>	<u>20.6</u>
Total	285.5	298.4

^aData from the Loving Municipal Quarterly Report, June 30, 1979. Detail may not equal total because of rounding. Entries are thousands of dollars.

^bActual expenditures adjusted by the Gross National Product Price Index. Index values for third and fourth quarters estimated.

Table 2-28. County Revenues: Eddy County (1978-1979)^a

Source of revenue	Actual revenues	Revenues in constant 1979 dollars ^b
OWN-SOURCE REVENUES		
Taxes	2,231	2,331
Property	910	951
Oil and gas	1,259	1,316
Lodgers	16	17
Special	45	47
Charges and miscellaneous	1,632	1,706
Licenses, permits, and fees	116	121
Charges for services	1	1
Fines and forfeits	1	1
Interest on investments	380	397
Payment in lieu of taxes	916	957
Miscellaneous	218	228
INTERGOVERNMENTAL TRANSFERS		
State	557	582
Gasoline tax	28	29
Cigarette tax	3	3
Motor-vehicle tax	429	448
Fire-district allotments	93	97
Miscellaneous	5	5
Federal	802	838
Revenue sharing	752	786
Taylor Grazing Act	44	46
Miscellaneous	6	6
Total	5,222	5,457

^aData from the Eddy County Treasurer's Financial Report for June, 1979. Detail may not add to total because of rounding. Entries are thousands of dollars.

^bActual revenues adjusted by the Gross National Product Price Index. Index values for the third and fourth quarters estimated.

Table 2-29. County Expenditures: Eddy County (1978-1979)^a

Service function	Actual expenditures	Expenditures in constant 1979 dollars ^b
General government	1,270	1,327
Personal services	518	541
Operating expense	670	700
Capital outlay	83	86
Public safety	713	745
Personal services	360	377
Operating expense	252	263
Capital outlay	100	105
Public works	1,671	1,746
Personal services	717	750
Operating expense	687	718
Capital outlay	267	279
Health and welfare	349	365
Personal services	16	16
Operating expense	316	330
Capital outlay	18	19
Recreation and culture	96	100
Personal services	0	0
Operating expense	51	54
Capital outlay	44	46
Total	4,099	4,284

^aEddy County Budget Report for month ending June 30, 1979. Detail may not equal total because of rounding. Entries are thousands of dollars.

^bAnnual expenditures adjusted by the Gross National Product Price Index. Index values for third and fourth quarters estimated.

Table 2-30. County Revenues: Lea County (1978-1979)^a

Source of revenue	Actual revenues	Revenues in constant 1979 dollars ^b
OWN-SOURCE REVENUES		
Taxes	2,810	2,937
Property	889	929
Oil and gas	1,921	2,007
Charges and miscellaneous	1,233	1,289
Licenses, permits, and fees	110	115
Charges for services	100	104
Fines and forfeits	25	26
Interest on investments	639	667
Payment in lieu of taxes	307	321
Miscellaneous	53	56
INTERGOVERNMENTAL TRANSFERS		
State	518	542
Gasoline tax	10	11
Motor-vehicle tax	484	506
Cigarette tax	2	2
Fire-district allotments	22	24
Federal	980	1,024
Revenue sharing	625	653
Taylor Grazing Act	21	22
Grants	334	350
Total	5,542	5,791

^aData from the Lea County Budget Officers Report (Detail of Receipts), June 29, 1979. Detail may not equal total because of rounding. Entries are thousands of dollars.

^bActual revenues adjusted by the Gross National Product Price Index. Index values for the third and fourth quarters estimated.

Table 2-31. County Expenditures: Lea County (1978-1979)^a

Service function	Actual expenditures	Expenditures in constant 1979 dollars ^b
General government	1,293	1,351
Personal services	487	509
Operating expense	398	416
Capital outlay	407	425
Public safety	674	704
Personal services	405	423
Operating expense	161	168
Capital outlay	108	112
Public works	1,895	1,980
Personal services	724	756
Operating expense	648	677
Capital outlay	523	547
Health and welfare	372	388
Personal services	46	48
Operating expense	201	210
Capital outlay	125	130
Recreation and culture	10	10
Personal services	0	0
Operating expense	10	10
Capital outlay	0	0
Total	4,243	4,433

^aData from the Lea County Budget Officers Report, June 30, 1979. Detail may not equal total because of rounding. Entries are thousands of dollars.

^bActual expenditures adjusted by the Gross National Product Price Index. Index values for third and fourth quarters estimated.

Table 2-32. School District Revenues: Carlsbad, Hobbs, Loving (1978-1979)^a

Source of revenue	Actual revenues			Revenues in constant 1979 dollars ^b		
	Carlsbad	Hobbs	Loving	Carlsbad	Hobbs	Loving
Operational fund	9,706	10,621	553	10,142	11,098	578
Local sources						
District school-tax levy	1,988	1,623	146	2,077	1,695	153
Other	105	203	20	110	212	21
State sources						
State equalization	6,951	8,392	350	7,263	8,769	366
Transportation	372	275	25	389	287	26
Other	158	84	5	165	87	5
Federal sources						
Public Law 874	146	0	3	153	0	3
Other	34	43	4	36	44	4
Abatements	(42)	(3)	0	(44)	(3)	0
Debt service funds	1,220	457	c	1,275	478	c
Interest fund	453	56	c	474	58	c
Principal fund	767	401	c	801	419	c
Building funds	9,726	21	0	10,163	22	0
Sale of Bonds	9,230	0		9,645	0	
Earnings from investments	494	20		516	21	
Other	2	c		2	c	
Federal-projects fund	754	326	103	788	341	108
Capital-improvement fund	467	76	42	488	79	44
Activity and cafeteria funds	1,026	1,052	54	1,072	1,099	56
Other funds	<u>243</u>	<u>0</u>	<u>0</u>	<u>254</u>	<u>0</u>	<u>0</u>
Total	23,142	12,553	752	24,182	13,117	786

^aData from the "Monthly Cash Report" and the "Monthly Activity Report," 1978-1979, for Carlsbad, Hobbs, and Loving School Districts. Detail may not equal total because of rounding. Entries are thousands of dollars. Parentheses indicate negative values.

^bActual revenues adjusted by the Gross National Product Price Index. Index values for the third and fourth quarters estimated.

^cLess than \$500.

total resources were allocated to the operational fund. State sources provided 77% of operational fund income, and local sources provided 22%. The largest single source of income for the year was a bond sale, which yielded \$9.23 million, or nearly 40% of receipts for 1978-1979.

District expenditures totaled \$15.2 million in 1978-1979, about \$8 million less than income (Tables 2-32 and 2-33). Operational expenditures accounted for 68% of total spending, with direct-instruction costs contributing the largest single share (34%).

The total assessed valuation of property in the district in 1977 was \$214 million, up 17% from the previous year. A total school-district tax rate of \$10.925 per \$1,000 of assessed valuation was in effect during both 1976-1977 and 1977-1978. In 1978-1979 the tax rate was \$17.509 (NMPSFD, 1978).

Hobbs

Hobbs School District, which includes much of central Lea County, had a 1978-1979 income of \$12.6 million (Table 2-32). About 85% of the total district income went to the operational fund. State sources provided more than 82% of operational-fund revenues, while local sources provided 17%.

A total of \$12.7 million was spent by the district in 1978-1979 (Table 2-33). Of this total, \$10.6 million, or 84%, were operational expenditures, chiefly for direct instruction.

The property in the district had a total assessed value of \$164 million in 1977, an increase of 9.5% over the previous year. The district tax rate for 1978-1979 was \$11.580 per \$1,000 of assessed valuation, down from \$11.780 for the previous year (NMPSFD, 1978).

Loving

Loving School District, which runs in a narrow band from Loving to the Eddy and Lea County line, had total revenues of \$752,000 in 1978-1979 (Table 2-32). Operational-fund revenues accounted for 74% of the total. State sources, primarily from property-tax equalization, provided 69% of operational fund revenues, while local sources provided 30%.

District expenditures amounted to \$785,000 in 1978-1979 (Table 2-33). Operational-fund expenditures accounted for nearly 80% of total spending, while special projects accounted for the remaining expenditures.

The total assessed valuation of property in the Loving district in mid-1977 was \$6.6 million, up 3.4% from the previous year. The district tax levy in effect for the 1978-1979 school year was \$10.925 per \$1,000 of assessed valuation, the same tax rate as that for the previous two years (NMPSFD, 1978).

Table 2-33. School District Expenditures: Carlsbad, Hobbs, Loving (1978-1979)^a

Expenditures	Actual expenditures			Expenditures in constant 1979 dollars ^b		
	Carlsbad	Hobbs	Loving	Carlsbad	Hobbs	Loving
Administration	327	309	37	342	323	38
Direct instruction	5,163	5,873	307	5,395	6,137	321
Instructional support	1,349	1,140	82	1,409	1,192	85
Health services	76	47	4	79	50	4
Pupil transportation	402	273	25	420	285	26
Operation of plant	815	930	50	851	972	52
Maintenance of plant	357	316	8	373	330	9
Fixed charges	1,319	1,237	78	1,378	1,292	82
Food services	8	0	0	8	0	0
Noninstructional support	172	71	4	180	74	5
Community services	34	57	17	35	60	18
Capital outlay	179	339	15	187	352	16
Special projects	47	23	0	49	24	0
Subtotal	10,247	10,613	627	10,707	11,090	655
Building fund	2,223	62	0	2,323	65	0
Debt service	252	572	0	263	598	0
Special projects	2,445	1,447	158	2,555	1,512	165
Total	15,168	12,695	785	15,849	13,266	820

^aData from the "Monthly Budget Report," 1978-1979, for Carlsbad, Hobbs, and Loving School Districts. Detail may not equal total because of roundings. Entries are thousands of dollars.

^bActual expenditures adjusted by the Gross National Product Price Index. Values for the third and fourth quarters estimated.

List of References

- Adcock, Larry, and Associates, 1977-1979. Demographic analysis using personal interviews with county officials: Clerk, Lea County, New Mexico, February 1978; Clerk, Eddy County, New Mexico, February 1978; Clerk, Loving County, New Mexico, February 1978; Clerk, Winkler County, Texas, March 19, 1978; various U.S. Geological Survey maps; Bureau of Land Management, landuse maps and quadrangles maps of the state of New Mexico, 1963 and 1965, from the New Mexico Highway Department, Planning Division.
- Adcock, Larry and Associates, 1977-1978. Demographic analysis utilizing data obtained from various sources.
- Adcock, Larry and Associates, 1979. Demographic analysis utilizing data obtained from various sources.
- Albrecht, Stan L., and Bruce A. Chadwick, 1980. Sociocultural-Impact Analysis of the Proposed Waste Isolation Pilot Plant (to be published).
- BBER (Bureau of Business and Economic Research), 1962. New Mexico Population Since 1910, Business Information Series No. 40.
- BBER (Bureau of Business and Economic Research), 1977a. Community Profile: Carlsbad-Eddy County, University of New Mexico.
- BBER (Bureau of Business and Economic Research), 1977b. Community Profile: Hobbs-Lea County, University of New Mexico.
- BBER (Bureau of Business and Economic Research), 1979a. Estimates and Projections of the Population of New Mexico by County 1975-1990, University of New Mexico.
- BBER (Bureau of Business and Economic Research), 1979b. Population Estimates and Projections: 1970-2000 Counties and Wastewater Planning Areas, University of New Mexico.
- Bennett, M.D., 1977. "Medically Underserved Areas of New Mexico," working paper, School of Medicine, University of New Mexico.
- Carlsbad Department of Development, 1977-1978. This is Carlsbad, New Mexico.
- Carlsbad School District, 1978. Forty-day Average Daily Membership.
- City of Carlsbad, 1979. Building permit data.
- Hobbs School District, 1978. Forty-day Average Daily Membership.
- Industrial Development Corporation of Lea County (IDCLC), 1979. Data, Hobbs, New Mexico.
- Loving School District, 1978. Forty-day Average Daily Membership.
- NMDB (New Mexico Department of Banking) 1979, Sixty-fourth Annual Report, 1979.

- NMDFA (New Mexico Department of Finance and Administration), 1979a. New Mexico Local Governments and the Property Tax.
- NMDFA (New Mexico Department of Finance and Administration), 1979b. Annual Report, New Mexico County and Municipal Governments, various years.
- NMDFA (New Mexico Department of Finance and Administration), 1979c. Municipal Quarterly Cash Reports (unpublished report filed by each incorporated New Mexico municipality).
- NMESD (New Mexico Employment Security Department), 1975-1979. Research and Statistics Division, various published and unpublished data.
- NMHRR (New Mexico Health Records Registry), 1979. New Mexico Statistical Summary.
- NMPSFD (New Mexico Public School Finance Division), 1978. Statistics.
- Rand-McNally Corporation, 1979. Commercial Atlas and Marketing Guide.
- Tiebout, C., 1962. "The Community Economic Base Study," Supplementary Paper 16, p. 74, Committee for Economic Development.
- USBM (U.S. Bureau of Mines), 1978. Annual Mineral Industry Survey, Department of the Interior, Washington, D.C.
- USDC (U.S. Department of Commerce), Bureau of the Census, 1970a. Census of Population, Series PC (1)-A033.
- USDC (U.S. Department of Commerce), Bureau of the Census, 1970b. Census of Housing.
- USDC (U.S. Department of Commerce), Bureau of the Census, 1970c. Census of Population, 4th County Summary (Computer) Tapes for New Mexico.
- USDC (U.S. Department of Commerce), Bureau of the Census, 1979, Population Estimates and Projections, "Projections of the Number of Households and Families: 1979 to 1995," Series P-25, No. 805, May 1979.
- USDC (U.S. Department of Commerce), Bureau of Economic Analysis, 1975-1979. Regional Measurement Division, unpublished data (computer printouts).
- USDC (U.S. Department of Commerce), Bureau of the Census, 1977a. "Gross Migration by County 1965 to 1970," Current Population Reports, Series P-25, No. 701, May.
- USDC (U.S. Department of Commerce), Bureau of the Census, 1977b. "Population Estimates," Current Population Reports, Federal State Cooperative Program, Series P-26, No. 76-31.
- USDI (U.S. Department of the Interior), National Park Service, Southwest Region, 1970-1978. Public Use in the Southwest Region, various monthly issues.

3. SOCIOECONOMIC EFFECTS OF REPOSITORY CONSTRUCTION AND OPERATION

3.1 Project Description, Setting, and General Impacts

The socioeconomic impacts discussed here are based on the conceptual design for the construction and operation of the WIPP repository. The impacts have been computed by economic modeling techniques that use an input-output procedure (see Appendix A). This work was supplemented with a substantial effort in on-site inspection and data-gathering.

Three communities have been closely analyzed for potentially significant impact: Carlsbad and Loving in Eddy County and Hobbs in Lea County. Carlsbad and Hobbs are the only two communities with more than 25,000 inhabitants within 50 miles of the WIPP site. Two scenarios have been developed for the analysis. Scenario I assumes that the maximum impact is exerted on Carlsbad and Loving, while Scenario II assumes a higher impact on Hobbs than is expected in Scenario I. Both scenarios were developed to produce the highest levels of expected impact.

In accordance with the information available in 1979, when most of this analysis was performed, the construction of the repository is assumed to begin in mid-1980 and end in the fall of 1984. The analysis is expected to remain valid for delays of up to two years in these dates if the actual starting time is substituted for mid-1980 and the other dates are adjusted accordingly. The construction phase includes completion of the Site and Preliminary Design Validation (SPDV) facility, for which two deep shafts and an underground experimental area are constructed. During that time, the number of construction workers in the surrounding labor-market area will increase. Underground construction, similar to a mine-development or mine-construction operation, will take place concurrently with the surface construction.

In addition to the workers employed by the construction contractor or subcontractors, certain management and design personnel employed by the Federal government, Sandia National Laboratories, and the Westinghouse Electric Corporation are expected to live in the local area during the construction and operation phases of the project. The number of these employees will vary, increasing as construction proceeds. To simplify the analysis, these individuals and their impact on the economy will, unless stated otherwise, be included in references to construction activity.

As a result of the construction and mining activities, industries serving the population and those servicing other businesses (mainly some manufacturing, service, and wholesale operations) will experience increases in business volume and the need for additional employees.

The socioeconomic analysis assumes that the impact will be primarily spread over both Eddy and Lea Counties. A survey* of labor-location patterns for the potash industry in the area of the site shows that approximately 88% of the work force lives in Carlsbad, 11% in the remaining portions of Eddy

*This analysis is based on personal interviews with potash mining officials during 1978.

County (with Loving assumed to receive 6%), and approximately 1% in Lea County. For Scenario I, the direct impact of construction and operation is assumed to follow this established pattern, while the indirect impact is distributed as follows: 80% to Carlsbad, 10% to areas outside Carlsbad in Eddy County (3% to Loving), and the remaining 10% to Lea County.

A survey of the large mining companies in the area revealed that one company had a significantly different employee-location pattern. This company had recruited through offices in Hobbs. The employee-location distribution for this company served as a model for Scenario II in which Lea County, particularly the city of Hobbs, will receive a higher level of impact from the construction and operation of the repository than in Scenario I. The distribution of direct and indirect impacts for Scenario II is as follows: Eddy County, 58%, with Carlsbad receiving 54%; Lea County, 42%, with Hobbs receiving 36%.

The procedures used to project employment, population, housing, income, and other socioeconomic effects are explained in Appendix A.

3.1.1 General Economic Impacts

During construction, approximately \$291.5 million will be expended for labor, equipment, and other construction costs, including expenditures for management and design activities from mid-1980 through 1986.* Because certain expenditures for equipment rentals, supplies, labor, etc., will go to areas outside Eddy and Lea Counties, and in some instances outside the state of New Mexico, only \$137.9 million will directly affect the economy of the two-county area. This figure includes labor costs and local procurements for the construction period, assumed to be slightly more than four years, and the checkout period preceding full operation in 1987. Indirect effects in the private sector will total an estimated \$112.4 million. The government sector (state, local, and indirectly affected federal agencies) will receive about \$14.8 million in new activity. The greatest local economic impact (direct and indirect) during a single year is expected to be about \$79.4 million during the third year of construction (1982).

Associated with the construction of the WIPP surface and underground facilities will be several other activities, including preoperational testing, personnel training, planning for waste acceptance, and various other support activities. These activities are referred to as management and design activities. After the end of construction in the fall of 1984, the management and design activities will continue for several months. Checkout is scheduled for completion in the first part of 1985 and preoperational testing in mid-1985.

During the latter part of 1985 and through 1986, employment in the operation phase will gradually increase. The full operational impact of the proposed plant is expected to be nearly static by the end of 1987.

*Unless otherwise stated, all dollar figures are in constant 1979 dollars.

As construction ends and the repository becomes operational, the economic impact will change significantly. Beginning in 1987, some \$23.5 million will be spent annually for the operation phase; only \$16.9 million will directly affect the economy of the area. The total local economic impact of the operation phase, both direct and indirect, will amount to almost \$33.0 million annually.

3.1.2 Other Events with Economic Impacts

In November 1977, Beker Industries and the Duval Corporation announced decreases in their Carlsbad-area labor forces of 100 and 200 employees, respectively. Since then, the labor market in Carlsbad has remained stable, with no appreciable increases or decreases in total employment. Regarding future activity, currently (November 1979), no organizations have announced firm plans to expand operations in the Carlsbad area.

The proposed Brantley Dam, an earthen structure to be built on the Pecos River between Artesia and Carlsbad, was to be under construction before 1980. However, funding for the project has been delayed, and it now appears that its construction will not overlap the construction of the WIPP. In fact, the Brantley Dam project may be delayed indefinitely. This possibility has been recognized in computing information for this study.

3.1.3 Employment

Much of the information presented in this subsection is summarized in Table 3-1, which shows, for each year of construction and operation, the number of jobs supported by the WIPP repository and the number of newcomers to the two-county area. These projections end in 1988 because it is assumed that the impact of repository operation will be nearly static by then.

Jobs directly connected with the WIPP repository have been estimated from information supplied by Sandia National Laboratories, the Bechtel Corporation, and the Westinghouse Electric Corporation. Jobs indirectly supported by construction and operation have been computed by a region-specific (Eddy and Lea Counties) input-output modeling process (see Appendix A).

3.1.3.1 Construction Phase

Construction will take approximately 54 months, beginning in mid 1980; associated activities in management and design and preoperational testing will continue through 1987. The average employment for 1980 has been established at approximately 65 construction-related jobs, and by the end of 1980 approximately 85 new jobs will have been created by the construction phase and the associated management and design activities.

Table 3-1. Yearly Averages of the Numbers of Jobs Supported by the WIPP
Repository: Eddy and Lea Counties

Year	Direct jobs--construction period			Subtotal	Indirect jobs	Total jobs	Net newcomers per year ^a
	Surface	Underground	Management and design				
1980	4	56	5	65	90	155	117
1981	68	162	52	282	435	717	486
1982	415	355	152	922	1,215	2,137	1,312
1983	551	119	281	951	1,176	2,127	318
1984	79	9	208	296	390	686	(1,185)
1985 ^b	--	--	269	269	346	615	(385)
1986 ^b	--	--	417	417	484	901	226
	Direct jobs--operation period			Subtotal			
	General operation	Security and remote control	Under-ground				
1987	256	44	140	440	514	954	91
1988	256	44	140	440	514	954	12
After 1988	256	44	140	440	514	954	0

^aGain (or loss) of population in the two-county area resulting from the WIPP repository.

^bThe job figures represent a mix of management and design personnel, as well as persons who will be employed during operation.

During 1981 employment is expected to increase dramatically. The average employment during 1981 will be approximately 230 jobs in construction and 52 jobs in associated management and design activities for a total (annual average) of 282 positions. By the end of the year, just more than 545 new positions will have been created by the construction phase and associated management and design activities.

In 1982 employment is expected to reach a peak. Direct construction activity jobs are expected to peak in late 1982 at just fewer than 1,100. Associated management and design positions should increase throughout the year, numbering approximately 210 by the end of 1982. The combined employment for construction and associated management and design is expected to reach just fewer than 1,300 by the end of 1982. The average number of construction jobs in 1982 should be about 770, while the annual average for nonconstruction jobs should be approximately 150 for the year.

In 1983 the annual average employment at the site for construction and the associated management and design activities is expected to increase slightly to 951. A second employment peak is expected to be reached late in the year, with a work force of just over 1,200. This peak in 1983 and the peak in 1982 are induced mainly by activity in the construction of surface facilities and should be short-lived.

Because construction is expected to be completed by the fall of 1984, the number of construction positions should decrease rapidly in the first half of the year. The average employment in construction for 1984 is estimated to be only 88. Associated management and design jobs will fluctuate throughout 1984, with the average number of jobs estimated to be 208. However, by the end of 1984, management and design personnel are expected to number only 163. The actual construction of the repository will have been completed.

Survey information on construction workers (OWRC, 1975) and job-applicant data for Eddy and Lea Counties from the State Office of Employment Security suggest that 54 to 61% of the workers directly employed in construction will be persons not residing in the area before the beginning of construction; the remaining workers will be drawn from the labor force in Eddy and Lea Counties.

The number of indirect, or spinoff, jobs supported by construction and the associated management and design activities will vary significantly during the construction period. The maximum impact on indirect jobs is expected to occur in 1982. The number of these jobs to be filled by newcomers migrating to the area because of the WIPP repository is difficult to determine. However, the area is now experiencing a significant population growth that is expected to continue. Taking this into account, it is assumed that approximately half the jobs created indirectly by construction will be filled by newcomers to the two-county area.

During peak employment periods for construction, the unemployment rate in the two-county area should drop substantially. Both Eddy and Lea Counties, which have experienced low unemployment rates in the past, are expected to have low unemployment during the beginning of the WIPP project. These low unemployment rates, as well as the availability of certain tradesmen in the

area and past patterns of job migration, influence the estimates of the numbers of persons who will be attracted to the area by new construction jobs or jobs created indirectly by construction. During 1982 and 1983, the number of persons expected to be employed from the local labor force is approximately half the unemployed pool as represented by 1978 figures.

3.1.3.2 Operation Phase

As the preoperation and checkout phase begins (late 1984 through 1986) and construction is completed, population and employment characteristics will change significantly.

During the latter half of 1984 and continuing through 1985, a "shakedown" period of facility checkout, preoperational testing, and personnel training will occur. Direct employment at the site will average some 269 in 1985, and will rise to 417 during 1986. As preliminary operations begin, this work force will have increased in an even fashion during 1985 and 1986, and by the end of 1986 a full complement of 440 operational positions will have been instituted for the start of full operation in 1987. Most of these jobs (256) will be directly connected with the general operation of the repository, while 140 persons will work on continuing underground operations and 44 will work in the security and remote-handling operations. In addition, 514 jobs will be supported indirectly. The total number of jobs directly and indirectly created by the operation phase will thus be about 954. This level should be reached by 1987.

The nature of the operational jobs requires a long training period for the operational personnel, who will be hired throughout the construction period and trained by the operating contractor. Radioactive waste will not be received until late in 1985. Prior to that time 200 to 270 workers will be employed in checkout and preoperational testing, with an economic impact similar to that of the management and design activity.

Several important aspects of the operational phase should be noted. In economic terms, the operational impact will be significantly smaller than the impact of construction. Moreover, shuffling of population caused by losses of construction and mine-development jobs and gains in operational jobs will occur from 1984 through 1986. Thus, significant in-migration and out-migration will result, not only because the number of jobs will change but because the required skills will change as well.

Studies of large construction projects have shown a lag time for out-migration once a project has been finished. It is therefore expected that the unemployment rate may increase by 0.5% to 1.0% for one to two years after construction has been completed. Because of the expected lag and the decrease in the number of workers needed for operational jobs, a population loss will occur during 1984 and 1985. It is expected that many workers will seek employment elsewhere, causing 1,500 to 1,600 people who had been directly or indirectly connected with the construction of the WIPP to move out of the two-county area. The total population there may drop slightly or remain static during 1984.

3.1.4 Personal Income

3.1.4.1 Construction Phase

During repository construction and checkout (1980-1986), more than \$93.2 million in new personal income will flow into the two-county economy in direct wages and salaries from construction and associated non-construction activities. In addition, about \$45.7 million in wages and salaries will come from businesses indirectly affected.

Personal income from interest, dividends, and rents will add another \$20.4 million during this period. The private sector will derive about \$159 million directly and indirectly from repository construction through 1984 and the time before full operation in 1987. In the public sector, about \$6.1 million in personal income will result from increased activity in the area and the additional state and local government employment required for support. Thus the total personal income added to the area during construction will be \$165.4 million over five to six years. However, a net loss from transfer payments (generally Social Security payments) will decrease this to \$157.5 million.

3.1.4.2 Operation Phase

The personal income to be derived from repository operation will be significantly lower than that derived during construction. As explained in Section 3.1.1, the amount of new money flowing directly into the two-county economy during a normal year of operation will be approximately \$16.9 million. Although this amount may vary with expenditure patterns in repository operation, a constant figure of \$16.9 million is used here. This figure is significantly different from the local direct expenditures of more than \$40 to 42 million during the peak years of construction (1982 and 1983). Because the direct impact is lessened, clearly the personal-income impact will be lessened.

The estimated \$16.9 million annual flow directly associated with repository operation will affect new personal income as follows: (a) approximately \$11.9 million will be realized from direct wages and salaries; (b) another \$5.5 million will come from wages and salaries in indirectly affected businesses; (c) about \$0.8 million per year will be derived from government payment for labor; (d) about \$2.5 million will come from dividends, interest, and rents. During the first years of operation, net transfer payments will be negative; later they will have a net positive effect. Because of this balancing effect, transfer payments for an average year have been considered neutral. The net result, therefore, will be an increase in total personal income of approximately \$20.7 million annually.

3.1.4.3 Personal-income Distribution: Scenario I

Carlsbad will receive approximately \$134.6 million (net) of the additional personal income generated by repository construction; other areas inside Eddy County but outside Carlsbad will receive nearly \$17.9 million. Personal income in Loving will be about \$7.8 million, or 45% of the income received in the county outside Carlsbad. The expected additions to total personal income

in Lea County will amount to about \$6.6 million. These impacts will be spread over a five to six-year period. During the operation phase, the annual personal-income impact in Carlsbad is expected to be \$17.7 million. The total countywide impact (including Carlsbad) will be \$19.9 million. Lea County should receive \$0.9 million annually.

3.1.4.4 Personal-income Distribution: Scenario II

In Scenario II, in which the impact on Hobbs is increased, \$66.2 million in new personal income will flow into Lea County during construction, with \$56.7 million of this entering the economy of Hobbs and the remainder going to areas in Lea County outside Hobbs. While the impact on Eddy County in Scenario II is significantly lower than that in Scenario I, the total income flow during construction is still substantial: \$91.4 million. Of this amount, \$85.1 million will directly enter the economy of the city of Carlsbad, with the remainder going to other parts of the county.

As operation begins, the impact will be substantially decreased, with new personal income totaling approximately \$8.7 million annually in Lea County and \$7.5 million in Hobbs. The annual impact in Eddy County is higher, with \$12.0 million for the county and \$11.2 million for the city of Carlsbad.

3.1.5 Statewide Economic Impacts

The socioeconomic analysis presented in this document is generally limited to the two-county area of primary impact--Eddy and Lea Counties, New Mexico. The period of impact covered begins with construction in mid-1980 and extends through the operation phase. However, before mid-1980 a significant amount of money will have been expended on the WIPP project for research, design, and various administrative activities. Some of this money will have flowed through parts of the state other than the two-county area. Although the distribution of this money through the state cannot be determined exactly, it can be estimated from the records of expenditures for the WIPP.

Since 1975 just less than \$76 million has been expended through the end of fiscal year 1979, and between the end of fiscal year 1979 and May 1980, an additional \$18 million is expected to be spent, for a total of just less than \$94 million. However, only a portion of this money has directly affected the state's economy: just over 60%, or \$57 million. Of that amount, approximately \$39 million flowed directly through the Albuquerque economy, \$16 million went through the Carlsbad economy, and just less than \$2 million went to other areas of the state. Since these expenditures were made over a period of approximately five years, the annual direct contribution to the state's economy was about \$12 million, with most of it going to the Albuquerque area.

The number of jobs directly created or supported by these expenditures varies from year to year. During fiscal year 1979, these expenditures directly supported just less than 200 jobs, including personnel from the Department of Energy, the Westinghouse Electric Corporation, Sandia National Laboratories, and various subcontractors. Multipliers for indirect impacts on a statewide basis are not available; however, because of the nature and salary levels of these jobs, the employment-multiplier effect should be between 1.25 and 1.75 additional jobs, or between 450 and 550 total jobs, including both direct and indirect jobs.

In terms of statewide employment, the effect is an increase of 0.1%. Proportionally, the employment impact in the Albuquerque area is about 70% of the statewide impact, or about 300 to 400 jobs on the average. In terms of the overall employment in the Albuquerque area, the effect is an increase of 0.2%.

As the project moves into the construction phase in mid-1980, some direct impacts will continue outside Eddy and Lea Counties. Except for several subcontracts with universities and individuals, most of the impacts will occur within the economy of Albuquerque.

Because Sandia National Laboratories and the Westinghouse Electric Corporation will carry out a significant part of their work through subcontracts and through the development of prototype equipment at various locations, it is difficult, if not impossible, to determine the economic effect of WIPP construction and operation on the Albuquerque area. However, it is apparent that the effect on the economy of Albuquerque will be significantly less than that occurring between 1975 and the beginning of construction. The effect after construction begins could possibly be less than half the effect that occurred before construction.

The indirect impacts that will be felt throughout the state in terms of new jobs and additional income (as a result of direct expenditures in Eddy and Lea Counties) should not be substantially greater than those reported for the two-county area. The linkages of those two counties with other business serving areas of the State appear to be weak. The major trade areas (i.e., the geographic areas for which major wholesale sector linkages are delineated) do not connect the two-county area to Albuquerque, the only large wholesale center in New Mexico (Rand-McNally, 1979). The Eddy County area is connected with El Paso, Texas, while the Lea County area is connected with Dallas, Texas. These linkages show that there is a significant flow of money out of the state to purchase products for businesses in the two-county area. The spinoff effects on the Albuquerque area are expected to be low.

Certain taxes, other revenues, and expenditures may accrue to and be incurred by the state. However, in relation to the total state operating expenditures and revenues from taxes, these fiscal impacts are not expected to be significant. Thus, the impact on areas outside Eddy and Lea Counties is not expected to be large enough in relation to existing activities to warrant detailed analysis.

3.2 Population

3.2.1 Population Growth

During the first year of repository construction (1980) fewer than 125 persons will be attracted to the area by construction and other repository related activities (Table 3-2). In 1981, about 475 additional people will be attracted, and in 1982 the construction phase will bring in more than 1300 in-migrants. During the fourth year of construction (1983), about 325 additional migrants will come to the area. Thus, the four-year cumulative

(1980-1983) total addition to the population of the two-county area will be about 2,250 people. As the construction effort slows in 1984, a loss of almost 1,200 persons is expected. In 1985 an additional loss of about 375 persons will occur.

Table 3-2. Population Migration Resulting from Jobs Directly and Indirectly Related to the WIPP Repository^a

Year	Direct		Indirect		Total	
	Annual migration	Cumulative migration	Annual migration	Cumulative migration	Annual migration	Cumulative migration
1980	75	75	50	50	125	125
1981	300	375	175	225	475	600
1982	825	1200	500	725	1325	1925
1983	b	1200	325	1050	325	2250
1984	(800)	400	(400)	650	(1200)	1050
1985	(25)	375	(350)	300	(375)	675
1986	200	575	25	325	225	900
1987	25	600	50	375	75	975
1988	b	600	b	400	b	1000
2010	0	600	0	400	0	1000

^aPopulation rounded to the nearest 25 persons. Parentheses indicate a loss of population (out-migration).

^bFewer than 13 persons.

The beginning of operations in 1986 should bring about 225 in-migrants directly or indirectly associated with the WIPP. It is projected that approximately 100 people will arrive in 1987 and 1988, producing a total population loss of 1,250 from the peak period of impact in 1983. The net change in population should remain constant throughout operation at just over 1,050.

Interviews with city officials (C. Tabor, City Manager, Carlsbad, 1979; K. Gleason, Assistant City Manager, Hobbs, 1979) indicate that Carlsbad and Hobbs will be able to accommodate the growth induced by the repository. Both cities have departments or agencies that carry on planning and associated functions and review the development plans for new subdivisions.

3.2.1.1 Distribution of Population: Scenario I

As explained in Section 3.1, Scenario I reflects current patterns in the place-of-residence choices of potash-company employees in the area; most of the WIPP-induced population change occurs in Eddy County. During 1980, fewer than 125 people are expected to migrate to the area because of jobs generated by the WIPP project. Through 1981, 600 people will have moved into the two-county area because of construction. Most are expected to locate in Eddy County, with Carlsbad housing just less than 500 new residents. Lea County is expected to receive only about 25 people in 1981 as a result of the project. In 1982 another 1,325 newcomers are expected in the two-county area. Most of these people (1,275) will locate in Eddy County. Carlsbad should receive about 1,125 new residents, while the population of Loving will increase by approximately 100. In Lea County new residents will number between 50 and 100. The pattern in 1983 will be similar, with only 325 new residents in the two-county area. The peak population impact will occur in 1983, when Carlsbad will have received a cumulative total of about 1,900 new residents, Loving just over 100, and other areas in Eddy County 100 people since the start of construction in 1980.

After 1983 the population impact will decrease, with an expected out-migration of 1,200 persons in 1984 and 375 in 1985. As operation begins in 1986, an in-migration of about 225 will occur. A slight WIPP-connected in-migration (less than 100) will occur in 1987, while the operational impact is expected to be static by the end of 1988 with less than 25 new residents during the year. The maximum impact in Lea County is projected at 150 new residents in 1983, with fewer than 100 during operation.

Overall population levels with WIPP-induced population changes under Scenario I are indicated in Table 3-3.

3.2.1.2 Distribution of Population: Scenario II

Although the number of people migrating to the two-county area is the same in Scenarios I and II, the distribution of population is significantly different. Of the 600 in-migrants attracted by the WIPP through 1981, about 350 will locate in Eddy County and 250 in Lea County. Carlsbad and Hobbs will receive 325 and 220 new residents, respectively.

The third year of construction (1982) will bring in another 1,325 people: 775 into Eddy County and 550 into Lea County. Hobbs will receive an expected additional 475 people; Carlsbad should receive less than 725. Thus, since the beginning of construction in 1980, Lea County will have received 800 new residents.

The peak population impact on Lea County and Hobbs will occur in 1983, with 950 new county residents, 800 of whom will locate in Hobbs. After the transition from construction to full operation, the net population addition to Lea County is projected at 420 people, with Hobbs receiving 360. Under Scenario II, the net operation-related population increase in Eddy County should reach 580, with some 540 persons locating in Carlsbad. Population projections for the area under Scenario II conditions are given in Table 3-4.

Table 3-3. Population Estimates and Projections for WIPP Scenario I^a

Year	Eddy County (99%, 90%) ^b	Carlsbad (88%, 80%) ^b	Carlsbad School District (93%, 85%) ^b	Loving (6%, 3%) ^b	Loving School District (6%, 3%) ^b	Lea County (1%, 10%) ^b
1970	41,119	21,297	25,498	1,192	1,350	49,554
1975	42,900	NA	NA	1,400	NA	51,600
1976	45,300	25,500	29,300	1,450	1,600	53,100
1977	46,200	26,600	30,400	1,500	1,650	55,100
1978	47,300	27,900	31,600	1,550	1,700	56,300
1979	48,200	28,600	32,400	1,600	1,750	57,500
1980 ^c	49,425	29,600	33,410	1,660	1,810	58,710
1981	50,780	30,710	34,640	1,680	1,830	60,030
1982	53,430	32,930	37,020	1,790	1,940	61,280
1983	54,120	33,480	37,690	1,800	1,950	62,620
1984	53,880	33,170	37,320	1,790	1,940	63,870
1985	54,430	33,360	37,590	1,830	1,980	65,230
1986	55,950	34,360	38,700	1,840	1,990	66,540
1987	57,340	35,230	39,680	1,900	2,050	67,740
1988	58,750	36,140	40,690	1,950	2,100	68,850
1989	60,150	36,940	41,590	2,000	2,150	69,950
1990	61,550	37,840	42,590	2,050	2,200	70,950
1995 ^d	65,250	40,040	45,090	2,150	2,300	75,150
2000	69,250	42,540	47,890	2,300	2,500	79,050
2010	73,150	44,940	50,590	2,450	2,600	88,150

^aIn Scenario I, the direct impact of the WIPP repository (construction and operation) is assumed to be distributed as follows: Carlsbad, 88%; Loving, 6%; rest of Eddy County, 5%; Lea County, 1%. The indirect impact is distributed as follows: Carlsbad, 80%; Loving, 3%; rest of Eddy County, 7%; Lea County, 10%. Data computed by Larry Adcock and Associates; NA = not available.

^bThe percentages given in parentheses are the direct and indirect population migration, respectively, resulting from the WIPP. Percentages may vary because of rounding.

^cConstruction of the WIPP repository assumed to begin in 1980. All impacts assumed to be static after 1987.

^dProjections for years beyond 1995 assume continued activity in the oil and gas industry at a stable but constant level. Present production levels measured against proved oil and gas reserves and recovery rates indicate that activity could decrease before 1990. However, secondary and tertiary (oil only) recovery procedures could prolong activity beyond the year 2010.

Table 3-4. Population Estimates and Projections for WIPP Scenario II^a

Year	Eddy County (58%) ^b	Carlsbad (54%) ^b	Remainder of Eddy County (4%) ^b	Lea County (42%) ^b	Hobbs (36%) ^b	Remainder of Lea County (6%) ^b	Hobbs School District (39%) ^b
1970	41,119	21,297	19,822	49,554	26,025	23,529	29,858
1975	42,900	NA	NA	51,600	NA	NA	33,300
1976	45,300	25,500	19,800	53,100	29,600	23,500	35,600
1977	46,200	26,600	19,600	55,100	30,550	24,550	36,900
1978	47,300	27,900	19,400	56,300	31,650	24,650	37,400
1979	48,200	28,600	19,600	57,500	32,600	24,900	37,950
1980 ^c	49,370	29,560	19,800	58,750	33,490	25,260	37,600
1981	50,550	30,530	20,020	60,250	34,620	25,630	38,790
1982	52,710	32,330	20,380	62,000	35,940	26,060	39,200
1983	53,300	32,810	20,490	63,440	37,000	26,440	41,320
1984	53,510	32,870	20,640	64,240	37,530	26,710	41,860
1985	54,180	33,160	21,010	65,480	38,390	27,090	42,760
1986	55,620	34,080	21,540	66,870	39,220	27,650	43,700
1987	56,970	34,930	22,040	68,110	39,950	28,160	44,530
1988	58,380	35,840	22,540	69,220	40,610	28,610	45,240
1989	59,780	36,640	23,140	70,320	41,260	29,060	45,960
1990	61,180	37,540	23,640	71,320	41,860	29,460	46,640
1995 ^d	64,880	39,740	25,140	75,520	44,310	31,210	49,390
2000	68,880	41,240	26,640	79,420	46,560	32,860	51,890
2010	72,780	44,640	28,140	88,520	51,910	36,610	57,840

^aIn Scenario II, the distribution of direct and indirect impacts is assumed to be as follows: Carlsbad, 54%; rest of Eddy County, 4%; Hobbs, 36%; rest of Lea County, 6%. NA = not available.

^bThe percentages given in parentheses are the gross population migration resulting from the WIPP project. Percentages may vary because of rounding.

^cConstruction of the WIPP repository assumed to begin in 1980. All impacts assumed to be static after 1987.

^dProjections for years beyond 1995 assume continued activity in the oil and gas industry at a stable but constant level. Present production levels measured against proved oil and gas reserves and recovery rates indicate that activity could decrease before 1990. However, secondary and tertiary (oil only) recovery procedures could prolong activity beyond the year 2010.

3.2.2 Population Within 10 and 50 Miles

The population within ten miles of the site is expected to change little in the foreseeable future. Only one new permanent residence is planned for construction, about eight miles west-southwest of the site (J. Mobley, personal interviews, 1978).

Mining employment within ten miles of the site may vary significantly with the national market for potash and with the level of activity in existing mining operations. However, the outlook for New Mexico potash and the current level of operations do not appear to dictate any large changes in the commercially associated daytime population of the area. The population associated with the many oil and gas wells in the area varies from day to day and is highly localized and difficult to predict.

The population within 50 miles is expected to increase significantly at certain locations. The 50-mile radius includes parts of three counties in New Mexico and parts of six counties in Texas. The population increases in Eddy and Lea Counties through the year 2000 will be concentrated in incorporated population centers identified in Section 2.1.1, Table 2-1.

Tables 3-5 through 3-8 show the population projected to live in subareas within 50 miles of the site in 1980 (the first year of construction), in 1990, in 2000, and in 2010. Many of the subareas have extremely small populations. Accurate forecasting for these subareas is not possible since a variation of less than 100 people causes a high percentage variation in population figures. The population change for these sparsely populated areas is based on trends established in areas outside the incorporated places in Eddy and Lea Counties and on a continuation of present activities in each of the defined radius sections. Between 1980 and 2000, the population within 50 miles is expected to increase by about 37,700 persons, or about 35%. The WIPP project, however, will account for less than 3% of the total growth during that time if, in fact, the population levels projected for those time periods are accurate.

3.2.3 Social Structure

The results of the impact analyses in Sections 3.1 and 3.2 suggest that the WIPP repository should have little effect on the social and cultural institutions of Eddy and Lea Counties. Any social and cultural impacts that might occur in a particular community may be expected to vary in degree with the overall impact exerted by the repository on that community. The most widely recognized negative social impacts would result from a temporary housing shortage and an increase in population from the in-migration of transient workers. Factors that will mitigate negative social impacts include the temporary nature of the housing shortage, minimal appreciable effect on public services, and relatively low levels of in-migration in comparison with the current population. Furthermore, since the in-migrants will probably be people of similar backgrounds, occupations, and transiency, inherent factors that would tend to create conflict will be limited.

Table 3-5. Resident Population by Distance and Direction from the WIPP Repository Site (1980, Maximum Impact--Scenarios I and II)

Sector	Miles from site						Total
	0-5	5-10	10-20	20-30	30-40	40-50	
N	0	0	35	25	175	25	260
NNE	0	0	25	5	55	5,690	5,775
NE	0	0	0	25	75	8,785	8,885
ENE	0	0	10	70	205	34,100	34,385
E	0	0	5	15	3,290	160	3,470
ESE	0	0	5	10	3,080	270	3,365
SE	0	0	5	20	20	30	75
SSE	0	0	0	25	10	40	75
S	0	0	5	15	50	15	85
SSW	6	0	5	30	95	15	150
SW	0	5	55	30	10	40	140
WSW	0	0	1,810	200	50	65	2,125
W	0	0	70	32,660	40	30	32,800
WNW	0	10	5	190	55	40	300
NW	0	0	30	20	65	12,260	12,375
NNW	0	0	15	5	220	10	250
Subarea total	6	15	2,080	33,345	7,495	61,575	104,515
Cumulative total	6	21	2,100	35,445	42,940	104,515	

Note: See Tables 3-3 and 3-4 for a description of the distribution of direct and indirect impacts associated with Scenarios I and II.

Population allocations into the various geographic sectors have been based on the maximum impact of both Scenarios I and II. This procedure leads to some double counting in a few areas, but increases the population count by a maximum of only 0.3% (approximately 400 people) in the overall area.

Table 3-6. Resident Population by Distance and Direction from the WIPP Repository Site (1990, Maximum Impact--Scenarios I and II)

Sector	Miles from site						Total
	0-5	5-10	10-20	20-30	30-40	40-50	
N	0	0	30	20	160	20	230
NNE	0	0	20	5	50	6,640	6,715
NE	0	0	0	20	65	10,860	10,945
ENE	0	0	10	65	185	42,625	42,885
E	0	0	5	15	3,840	140	4,000
ESE	0	0	5	10	3,595	255	3,865
SE	0	0	5	15	20	25	65
SSE	0	0	0	25	10	40	75
S	0	0	5	15	45	15	80
SSW	6	0	5	30	100	15	155
SW	0	5	50	15	10	40	120
WSW	0	0	2,245	175	50	65	2,535
W	0	0	65	41,145	40	35	41,285
WNW	0	10	5	185	50	45	295
NW	0	0	30	20	60	15,975	16,085
NNW	0	0	15	5	235	10	265
Subarea total	6	15	2,495	41,765	8,515	76,805	129,600
Cumulative total	6	21	2,515	44,280	52,795	129,600	

Note: See Tables 3-3 and 3-4 for a description of the distribution of direct and indirect impacts associated with Scenarios I and II.

Population allocations into the various geographic sectors have been based on the maximum impact of both Scenarios I and II. This procedure leads to some double counting in a few areas, but increases the population count by a maximum of only 0.3% (approximately 400 people) in the overall area.

Table 3-7. Resident Population by Distance and Direction from the WIPP Repository Site (2000, Maximum Impact--Scenarios I and II)

Sector	Miles from site						Total
	0-5	5-10	10-20	20-30	30-40	40-50	
N	0	0	30	20	150	20	220
NNE	0	0	20	5	45	7,385	7,455
NE	0	0	0	20	60	12,070	12,150
ENE	0	0	10	60	175	47,335	47,580
E	0	0	5	15	4,080	135	4,235
ESE	0	0	5	10	3,890	240	4,145
SE	0	0	5	15	15	25	60
SSE	0	0	5	20	10	35	70
S	0	0	5	15	45	15	80
SSW	6	0	5	30	100	15	155
SW	0	5	60	15	10	50	140
WSW	0	0	2,545	195	50	70	2,860
W	0	0	75	46,225	40	35	46,375
WNW	0	10	5	205	60	50	330
NW	0	0	30	20	70	14,915	15,035
NNW	0	0	15	5	260	5	285
Subarea total	6	15	2,820	46,875	9,060	82,400	141,175
Cumulative total	6	21	2,840	49,715	58,775	141,175	

Note: See Tables 3-3 and 3-4 for a description of the distribution of direct and indirect impacts associated with Scenarios I and II.

Population allocations into the various geographic sectors have been based on the maximum impact of both Scenarios I and II. This procedure leads to some double counting in a few areas, but increases the population count by a maximum of only 0.3% (approximately 400 people) in the overall area.

Table 3-8. Resident Population by Distance and Direction from the WIPP Repository Site (2010, Maximum Impact--Scenarios I and II)

Sector	Miles from site						Total
	0-5	5-10	10-20	20-30	30-40	40-50	
N	0	0	30	20	160	20	230
NNE	0	0	25	5	50	8,300	8,380
NE	0	0	0	25	70	13,500	13,595
ENE	0	0	10	70	195	52,850	53,125
E	0	0	5	15	4,605	135	4,760
ESE	0	0	5	10	4,335	240	4,590
SE	0	0	5	20	20	25	70
SSE	0	0	0	20	10	35	65
S	0	0	5	15	45	15	80
SSW	6	0	5	30	100	15	155
SW	0	5	65	15	10	50	145
WSW	0	0	2,645	205	55	75	2,980
W	0	0	80	49,465	40	35	49,620
WNW	0	10	5	230	65	55	365
NW	0	0	30	20	75	15,770	15,895
NNW	0	0	15	5	275	5	300
Subarea total	6	15	2,930	50,170	10,110	91,125	154,355
Cumulative total	6	21	2,930	53,120	63,230	154,355	

Note: See Tables 3-3 and 3-4 for a description of the distribution of direct and indirect impacts associated with Scenarios I and II.

Population allocations into the various geographic sectors have been based on the maximum impact of both Scenarios I and II. This procedure leads to some double counting in a few areas, but increases the population count by a maximum of only 0.3% (approximately 400 people) in the overall area.

The WIPP repository may affect some social (economic) classes and ethnic groups slightly more than others, but it will have relatively little effect on the region's community organizations.

3.2.3.1 Sociocultural Impacts

To obtain information on community attitudes toward, and perceptions of, the proposed WIPP project, a series of unstructured discussions was conducted in the area of primary impact (Carlsbad, Loving, and Malaga in Eddy County; Hobbs in Lea County). The general topics raised during the discussions included social background, perceptions of the local community, perceptions of the costs and benefits of the WIPP, and perceptions about the need for a WIPP-type project and the storage of radioactive waste.

The discussants were selected by two methods. In the first, a list of key informants was developed by identifying those persons whose statements about the WIPP project had appeared in either newspapers or other media. The key-informant group was then expanded by asking the persons on the original list to suggest other persons for the survey. The resulting key-informant group was composed primarily of persons who are active in political, civic, business, and environmental affairs. Discussions were conducted with a total of 55 persons, or 51% of the key-informant group.

In the second selection method, a random sample of Carlsbad-area residents was drawn from local telephone listings. Discussions were conducted with 138 persons, or 60% of the random-sample group.

The key-informant and random-sample groups were intended to provide a cross section of citizens from which to assess attitudes and perceptions for the area of primary impact.

All of the discussions were conducted by trained research assistants: two men and two women. One of the research assistants was an Hispanic-American; two spoke fluent Spanish.

Local Knowledge About the WIPP Project

In recent months, the proposed WIPP project has received much attention in local as well as state, regional, and national media. Public hearings have been very well attended, and local interest groups that support or oppose the project have been organized. It is not surprising that most area residents have some familiarity with the WIPP proposal. None of the key informants and fewer than 3% of the random sample indicated that they had "no knowledge" about the project. Among the key informants, a total of 78% indicated that they knew "much" or "a great deal," with the remainder reporting they knew "something, though not a great deal" about the project. In contrast, among the random sample, only about 10% felt they knew "a great deal" about the project; most simply indicated that they knew "a little" or "something" about what was being proposed.

Primary Benefits and Problems Associated with the Proposed Project

Members of both the key-informant and the random-sample groups were asked to specify what they perceived as the primary benefits and major problems associated with the proposed project. The benefits, which were perceived similarly by discussants in both groups, were classified in two major categories: (a) benefits that would accrue to the local communities and their inhabitants and (b) benefits that would accrue to the state or the nation. In the first instance, many area residents perceived that the proposed project would bring significant economic benefits to the local area in the form of new jobs, new housing, more business, and increases in local property values. Immediate economic benefits were anticipated from the population growth and new jobs generated by the construction of the WIPP repository. Long-term benefits were associated primarily with operational employment. Several said that the primary economic benefits would go to the local business community and that the "poor" and "minority" groups in the area would not be helped at all.

Most of those who identified national benefits made reference to the contribution that the Carlsbad area could make to the nation in providing a location for the storage of radioactive waste. A theme of "national duty" was present in many of the discussions.

Several spokesmen for minority interests expressed the hope that new job training programs could be developed from the project to teach new skills and provide new job opportunities for minority residents. If this were to be the case, then the benefits could be shared by a wider cross-section of the population including residents of the area's smaller communities, such as Loving.

Regarding the perceptions of major problems associated with the project, the key-informant group expressed negligible concern, while the random-sample group expressed numerous concerns that were much more diverse than were their perceptions of benefits. The major problem areas were the following:

1. Inflation and price increases associated with population growth.
2. Problems associated with providing services and facilities for an expanding population.
3. The attraction of "undesirable" people to the area, which would result in increased crime and other social problems.
4. Increased strain on housing and transportation.
5. Basic concerns about health and safety problems, including fears about contamination and accidents.
6. The belief that a rapid population growth could overwhelm the local culture, particularly in some of the smaller communities such as Loving.

7. Problems created by outsiders who come to "agitate and protest."

8. The possibility of accidents and strikes at the construction site.

Each of these problems was identified by two or more of the discussants. The most prevalent concerns, however, were in the area of population growth and the provision of services and facilities.

Housing shortages were already perceived as a problem in the area, and most local residents were convinced these shortages would be aggravated if the project is approved and large numbers of construction workers move into the area.

Distribution of Impacts Among Area Residents

As already mentioned, a number of people who identified specific WIPP-related benefits felt that these would not be distributed evenly throughout the community. The general feeling was that most of the economic benefits would be realized by the business community. Others said that those who owned property would benefit because the housing shortage would force real-estate values to increase drastically.

On the other side of the question, the discussants felt that those most likely to be affected negatively were retired people and those on fixed incomes. The reasons for the negative impacts were the expected rise in the cost of living and a shortage of housing. Minorities were expected neither to benefit nor to experience economic difficulty from the project. However, two key informants who represented the Hispanic-American community in Carlsbad and Loving expressed the belief that there would be negative impacts on minorities.

Impacts on Recreation and Tourism

In response to questions about the possible effects of the WIPP repository on recreation and tourism, which are of critical importance to Carlsbad and some of the surrounding communities, most discussants expressed the view that there would be no impacts. The general feeling seemed to be that, since the proposed site was isolated and underground, most people would simply be unaware of the existence of the repository unless it were advertised. A minority, however, felt there would be some negative impacts on local recreation. These were related particularly to fears of the area being labeled the "nuclear wasteland of the world" or a "national sacrifice area."

Community Change

One-third of the discussants felt that the "quality of life" in their area would be adversely affected by the proposed development. One-half of the key informants and slightly more than two-fifths of the random sample felt that the area would improve. A majority, then, anticipates either some improvement or no change in the quality of local life if the project becomes a reality. However, a significant minority felt that the overall effect on the quality of life would be negative because of increased strains on local facilities, a

"boom-and-bust" cycle, fear and anxiety about the facility, a potential increase in the "transient" population, and increased costs for goods and services. Those who expected the area to improve felt that the economic boost and the increase in population would benefit Carlsbad and surrounding communities. Many expressed the hope that the area would not change because they like it very much as it is.

Each discussant was asked to indicate what community changes were likely to occur in such areas as health and mental-health care, family life, and civic affairs. A majority felt that health care would be upgraded to keep pace with demands, while mental-health concerns centered on the effects of anxiety and fear. Most felt family life would not change. No major changes were anticipated in local civic affairs.

Safety Concerns

Many of the objections to the project, expressed by both groups, were concerns about safety. Less than half the key informants expressed concerns about safety at the site, but a majority of the random sample said that they did have some concern about safety. The major issues center on fear of human error, distrust of government, radiation leakage, and geologic instability at the site.

The discussions concerning potential transportation problems were similar. A majority of the discussants expressed some concern that the transportation of radioactive waste to the WIPP site could present a potential danger for the local area. Frequent mention was made of the generally poor quality of the existing highway system in the vicinity of the site.

Attitudes Toward Construction and Operations Workers

Although some western communities have experienced significant problems associated with the in-migration of large numbers of construction workers, most of the discussants did not perceive the in-migration of construction workers to be a serious problem.

Because of the technical skills that would be required, most of the discussants anticipated that the large majority of the operating personnel would have to come from other areas. Again, the discussants believed that no significant problems would result from the in-migration of these specialized workers.

There was general consensus among both groups that as many local workers as possible should be used. Some persons expressed the hope that training programs could be established so that more local people could obtain employment. Among the local communities, it was anticipated that Carlsbad and Hobbs would benefit most because of their proximity to the site and because of the size of their labor forces.

Attitudes Toward Radioactive Waste

When asked about the general need for the disposal of radioactive waste, independent of the immediate local situation and personal interests, a large

majority, about three out of four persons in both groups said they feel there is an urgent need to store such waste in safe, permanent locations. Sixteen percent feel the need is less than urgent.

Although a majority feels there is a need for permanent disposal sites, less than half of both the key-informant and the random-sample groups felt that the proposed site was desirable. Therefore, over half the discussants from both groups feel that the Carlsbad area is not a good location for the disposal of radioactive waste.

A number of locations were identified as being more suitable than the local area. The most frequent suggestion was to locate radioactive-waste repositories where "there is no population" or "away from people." Utah, Arizona, and Nevada were identified by several discussants as having lower population densities than New Mexico and thereby being more desirable as sites. A large number of discussants feel that the waste should be disposed of near the facility where it is created.

Conclusion

The discussants feel that the area is a highly desirable place to live. They are generally aware of the WIPP project. Favorable economic impacts are anticipated along with some negative socioeconomic ones. Business is expected to benefit. Recreation and tourism will be unaffected. The quality of life in the area is generally expected to remain as it is. There is some concern about the safety of the project, and this is expected to be manifested by some anxiety and stress. Many of the discussants expressed a belief that the Carlsbad area may not be the best site for the permanent disposal of radioactive waste.

3.2.3.2 Labor Unions

Many WIPP employees, primarily miners, may be affiliated with a union. One of the several unions that represent potash and other workers in Eddy County might be expected to organize the workers, although the workers may choose to become affiliated with a union new to the area. In either case, the WIPP should not affect the importance of organized labor in the region.

3.2.3.3 Social Services

The Carlsbad-Loving and Hobbs areas provide an extensive range of social services and activities for the various social, ethnic, and income classes that make-up the population of the two-county area. The expected impacts from the population increases and the increased economic activities associated with the construction and operation of the WIPP repository will not affect the social-services facilities to the extent that they would be unable to accommodate demand. In all cases, only nominal staff increases would be necessary to accommodate WIPP-induced demand for area services.

3.2.3.4 Churches and Other Community Organizations

The influx of workers and their families will cause little increase in the number and types of churches and community organizations or in the memberships of existing organizations. The relatively small population increment is one reason. Another is that the new people, mostly blue-collar workers, will tend to join few organizations other than churches, which will probably show the greatest increases. The newcomers, if drawn from adjacent labor-market areas, will probably tend to be Protestant; the large number of small churches will probably absorb virtually all of them.

3.3 Economic Setting

3.3.1 Private Sector

Although the private sector is strong in both Eddy and Lea Counties, its economic base is rather narrow, with most economic activities centering on mining. In Eddy County potash mining is the most active sector; in Lea County the oil and gas industry is more active than any other industrial sector. Retail trade and services (normally nonbasic sectors) are also partly a basic industry in Eddy County because of the large numbers of tourists attracted by Carlsbad Caverns. Other basic industries in the area, such as agriculture and manufacturing, are substantially less active than mining.

3.3.1.1 Industrial Activity

During the construction of the WIPP repository, certain industries in Eddy and Lea Counties are expected to become more active. Because the WIPP will need highly specialized equipment, much of the construction materials and nearly all of the technical equipment will be purchased outside the area. However, basic materials (sand and gravel, rock, certain electrical products, and concrete) can be purchased in the area. It is expected that construction will bring in approximately \$8.7 million in new business to the manufacturing sector in the two-county area (Tables 3-9 and 3-10).

As the project moves from construction into operation, its effect on the various economic sectors in the two-county area will change significantly. The operational phase will be similar to a warehousing operation with one important exception: the mining operations will continue.

During repository operation, the impact on local manufacturing is expected to be minimal. Examples of businesses that would experience some impact are chemicals, printing products, and machinery manufacturing. An impact may be felt indirectly in the manufacturing of food products because of increased demand. Spinoff to the industrial manufacturing system in the two-county area will be minimal.

The mining operation will also have minimal effect in attracting new industry because potash mining already dominates an extremely large portion of the economy of Eddy County. The economic impacts of the WIPP mining operation will, for the most part, flow through industries that are already established.

Table 3-9. Estimated Annual Indirect Impacts from Construction and Operation of the WIPP Repository, by Major Economic Sector^a

Sector	1980		1981		1982		1983		1984		1985		1986		Operation	
	Volume	Jobs	Volume	Jobs	Volume	Jobs	Volume	Jobs	Volume	Jobs	Volume	Jobs	Volume	Jobs	Volume	Jobs
Agriculture	0.1	0.3	0.2	1.8	0.5	5.2	0.5	5.0	0.2	1.5	0.1	1.2	0.2	1.7	0.2	1.9
Mining	0.1	0.6	0.5	4.4	1.3	12.2	1.2	10.9	0.3	2.6	0.3	1.2	0.4	2.0	0.4	2.5
Construction ^b	0.1	1.2	0.2	6.3	0.4	17.5	0.5	18.6	0.2	7.5	0.2	1.4	0.3	10.6	0.3	12.7
Manufacturing	0.2	2.0	0.9	9.6	2.6	26.8	2.5	25.7	0.8	8.3	0.7	7.4	1.0	10.4	1.3	14.0
Transportation, communication, & utilities	0.4	7.2	2.0	37.3	5.5	102.6	5.2	100.3	1.8	34.3	1.6	30.9	2.2	43.1	3.0	53.4
Trade	1.2	43.3	5.9	207.4	16.2	574.8	14.3	525.2	4.0	155.2	3.1	126.5	4.3	176.6	4.7	192.4
Finance, insurance, & real estate	0.3	8.3	1.5	43.2	4.3	121.0	4.4	123.6	1.6	44.5	1.5	41.6	2.1	58.1	2.0	57.5
Services	0.3	16.3	1.9	80.3	5.4	224.5	5.8	237.3	2.3	93.2	2.3	92.4	3.3	129.0	3.0	121.4
Government	0.3	9.8	1.5	44.6	4.3	130.5	4.3	129.1	1.4	41.9	1.2	37.2	1.7	51.9	1.9	58.3
Total	3.0	89.0	14.6	434.9	40.5	1215.1	38.7	1175.7	12.6	389.0	11.0	339.8	15.5	483.4	16.8	514.1

^aIncludes indirect impacts from both construction and nonconstruction activities. Entries for "Volume" are millions of 1979 dollars.

^bA portion of the construction-sector impact is experienced in the finance, insurance, and real estate sector because of the procedures followed in building the national input-output model by the Bureau of Economic Analysis, Department of Commerce. The exact impact of the portion cycled through the finance, insurance, and real estate sector is not available.

Table 3-10. Estimated Indirect Impact from a Typical Year of Full WIPP Operation, by Major Economic Sector ^a

Sector	Volume	Jobs
Agriculture	\$0.2	1.9
Mining	0.4	2.5
Construction ^b	0.3	12.7
Manufacturing	1.3	14.0
Transportation, communications, and utilities	3.0	53.4
Trade	4.7	192.4
Finance, insurance, and real estate	2.0	57.5
Services	3.0	121.4
Government	<u>1.9</u>	<u>58.3</u>
Total	\$16.8	514.1

^aIncludes indirect impacts from both construction and nonconstruction activities. Entries for volume are millions of dollars.

^bA portion of the construction-sector impact will be experienced in the finance, insurance, and real-estate sector because of the procedures followed in building the national input-output model by the Bureau of Economic Analysis, Department of Commerce. The exact impact of the portion cycled through the finance, insurance, and real-estate sector is not available.

3.3.1.2 Trade and Services

Trade will be one of the most significantly affected sectors outside the industries receiving direct impacts. It is expected that the increase in wholesale and retail sales during repository construction will total about \$49.1 million. The largest impacts will occur in 1982 (\$16.2 million) and 1983 (\$14.3 million), when direct employment will total more than 900 jobs annually for the two years. Most of these impacts will be created through increased buying in the household sector, although businesses will also make purchases from the retail sector. However, most of the local procurement for construction will be made from wholesale outlets. Substantial increases are also expected in the services sector, with nearly \$21.4 million in indirect new business.

This analysis assumes that the construction-phase demand for goods and services will take advantage of the goods and services available in the area. It also assumes that the variety of goods and services offered in the area will not change substantially during the construction period.

Beginning in 1987, repository operation will add \$4.7 million annually to wholesale and retail sales in the area; this will be larger than the impact on any other identified sector. Much of it will flow into the secondary and tertiary industries rather than into manufacturing or other basic industries. The annual impact on finance, insurance, and real estate will be some \$2.0 million, and the services sector will also enjoy a substantial increase, just more than \$3.0 million per year.

In summary, the response of the private sector to both the construction and the operation of the repository will be expressed in increased activity in many of the existing secondary and tertiary industries. The operational phase will bring very few new manufacturing firms. However, small-equipment manufacturers and fabricated-metal operations may be attracted by the maintenance and construction activities during the operational phase and the need for equipment repairs.

3.3.1.3 Tourism

Certain aspects of tourism in the two-county area may be affected by the WIPP repository. Detailed effects are, however, difficult to define at present.

Tourism directly affects retail trade, hotels and motels, eating and drinking establishments, service stations, and other trade and service sub-sectors. To a lesser degree, it also influences certain government operations (e.g., those of the National Park Service) and some manufacturing activities (e.g., curios and jewelry).

Tourism in the two-county area is concentrated around the caverns in the Carlsbad Caverns National Park, 22 miles southwest of Carlsbad. The park is an unusual attraction, one not likely to lose its popularity because of the repository. Other areas, such as the Living Desert State Park just west of Carlsbad, offer a variety of recreational opportunities enjoyed by out-of-state visitors but do not necessarily attract many tourists beyond those visiting Carlsbad Caverns.

Historically, the existence of nuclear-weapons laboratories and atomic-energy research establishments in New Mexico has not hindered tourism. A prime example is the city of Los Alamos, the site of the Los Alamos National Scientific Laboratory. Tourism in Santa Fe, only 40 miles away, has continued to increase, and Los Alamos itself has become a point of interest. Thus past experience indicates that the WIPP repository will exert no significant adverse impacts on tourism over an extended period.

There may, however, be some short-term impacts on hotels, motels, and other services and facilities serving tourists. As construction proceeds, a number of transient construction workers will locate in the area. Many are

expected to live in temporary quarters for short periods. Past experience reveals that many construction workers stay in camping trailers, campers, or mobile homes owned by concession companies during the work week and travel home for weekends; others may stay in motels and hotels. The transient workers may therefore decrease the overnight facilities available to tourists. This impact is likely to last only one to two years. During operation this impact is not likely since temporary housing facilities will not be affected to any degree.

3.3.2 Housing and Land Use

3.3.2.1 Total Housing Requirements

The total demand for housing by the in-migrants directly or indirectly attracted by the WIPP is indicated in Table 3-11. Repository related housing demand peaks in 1983 with 880 total housing units, decreases to 330 total units in 1986, and thereafter remains stable.

Table 3-11. Total Annual Housing Demand Induced by the WIPP Repository

Year	Total ^a	Permanent single family	Permanent multifamily	Mobile homes and others
1980 ^b	50	20	5	25
1981	240	80	25	135
1982	770	260	80	430
1983	880	300	90	490
1984	390	130	40	220
1985 ^c	240	135	20	85
1986	330	230	20	80
1987	360	290	20	50

^aTotal housing demand based on population migration projections resulting from direct and indirect jobs (Table 3-2). Detail may not sum to total because of rounding.

^bAllocation of total demand to housing types from 1980-1984 based on housing demand for construction workers in Construction Worker Profile (OWRC, 1975).

^cAllocation of total demand for housing types from 1985-1987 based on averages of distinct housing-type demands of construction workers and long-term residents.

The composition of housing demand (OWRC, 1975) is expected to change as construction ends and operation begins. During construction, there is likely to be a relatively large demand for mobile homes and multifamily units; during operation, 81% of the demand will be for single-family units.

3.3.2.2 Scenario I: Carlsbad

Housing

According to Table 3-12, the projected baseline-population increases for Carlsbad call for an addition of at least 1,430 housing units from the end of 1977 through mid-1981; this figure, which would drop the vacancy rate to zero, comes from subtracting the total housing stock at the end of 1977 (9,420) from the occupied housing in mid-1981 (10,850). When added to the current total of 34 substandard units not suitable for rehabilitation, this means an increase of about 1,460 units over the 3.5 years, or an average of about 420 units per year--somewhat less than the rate of construction in 1977.

Housing construction planned by developers for the four years from 1978 through 1981 calls for somewhere between 1,650 and 1,750 new units. However, because of an extremely tight mortgage-loan market, the exact time when these units will be built is not known. Interviews with local bankers and the Carlsbad Planning Department indicate that there has been a slowdown in new housing starts over 1978-1979, and it appears that construction will not keep pace with projected demand. Thus, even under baseline conditions, Carlsbad could face a significant housing shortage by mid-1980.

To bring the vacancy rate up to 3% by mid-1981, a total of 1770 units must be added over the 3.5-year period (Table 3-12). This is an average of 505 units per year, somewhat above the maximum of 438 units per year planned for the 1978-1981 period. It thus appears that, if planned construction rates are continued into 1981, addition to the housing stock will be insufficient to bring the total housing stock to a level providing a vacancy rate of 3%.

Baseline-population projections for the period 1981-1985 call for 1110 new housing units, or 270 per year. The next two years are projected to show an increase in housing demand of 590 units, or 295 per year. Maintaining a 3% vacancy rate over the 1981-1987 period would require an additional 2,080 units, or 350 per year (Table 3-12).

The population increase associated with the WIPP project will raise housing demand for the 1980-1984 period to 1,490 units, or 375 per year. The primary impact of the repository, however, will be in the year from mid-1981 to mid-1982: housing demand will increase by 890 units over the year versus 440 units under baseline conditions. Moreover, much of the increase will occur soon after the start of construction. It appears that a housing shortage might develop in 1981 or 1982 if Scenario I conditions prevail (Table 3-12).

After reaching a peak of 890 units in 1982, the WIPP-induced housing demand will decrease to 240 units the following year. Housing-demand projections indicate that an excess of 120 units will exist in the Carlsbad area by 1984. This excess will be eliminated by 1985, and thereafter demand will level off (Table 3-12).

Table 3-12. Annual Housing Demand for Scenario I: Carlsbad

Year	Occupied housing		Change from previous year		Occupied housing plus 3% vacancy rate		Change from previous year	
	Baseline	With WIPP	Baseline	With WIPP	Baseline	With WIPP	Baseline	With WIPP
1977	9,290 ^a	--	--	--	9,420 ^b	--	--	--
1978 ^c	9,810	--	520 ^d	--	10,120	--	700 ^d	--
1979	10,130	--	320	--	10,450	--	330	--
1980 ^e	10,530	--	390	440	10,850	10,900	410	440
1981	10,850	10,570	330	490	11,190	11,400	340	510
1982	11,290	11,060	440	890	11,640	12,320	450	910
1983	11,440	12,180	150	240	11,800	12,560	160	240
1984 ^f	11,740	12,060	300	(120)	12,100	12,440	310	(120)
1985	11,960	12,170	230	110	12,330	12,550	230	110
1986	12,260	12,530	290	370	12,630	12,920	300	380
1987	12,550	12,850	290	320	12,930	13,250	300	330

^aEstimated year-end occupied units.

^bActual year-end housing stock, based on U.S. Department of Commerce, 1970 Census of Housing, and subsequent building-permit and demolition data for Carlsbad.

^cFigures for 1978 and subsequent years are mid-year.

^dSix-month change.

^eBeginning year of construction. Impact assumed to be static after 1986.

^fParentheses indicate negative amount.

The increased vacancy rate in 1984 is attributed to a lag between the construction and the full operation of the repository. As construction nears completion in late 1983 and early 1984, a significant number of repository workers will leave the Carlsbad area (Table 3-2). However, this reduction in staff and the corresponding increase in locally available housing will be short-lived and should cause no major problems.

There are three factors that might mitigate the shortage projected for 1981 and 1982. First, it is possible that interest rates will decrease, thereby expanding the availability of money for mortgage loans. Any housing shortage resulting from excess demand could then be expected to be controlled by an increase in housing supply. Second, a relatively large number of construction workers tend to prefer mobile homes (Table 3-13). Third, construction workers are highly mobile. Construction activity can be expanded more rapidly than most other industrial activities. In fact, the sudden increase in housing demand is itself a result of the assumption that the level of construction activity on the project can be rapidly expanded.

Table 3-13. Annual WIPP-Induced Housing Demand for Scenario I by Type of Dwelling: Carlsbad^a

Year	Total	Permanent single family	Permanent multifamily	Mobile homes and other
1980	40	15	5	20
1981	210	70	25	115
1982	660	220	70	370
1983	740	250	80	410
1984	325	110	35	180
1985	205	70	20	115
1986	280	95	30	155
1987	310	105	35	170

^aDetail may not equal total because of rounding. The allocation of total demand to housing types is based on the housing preferences of construction workers and other newcomers in Construction Worker Profile (Old West Regional Commission, 1975).

It is impossible to predict the extent to which these factors will mitigate the housing shortage at the start of repository construction. It appears that there will be some shortage, however, with an associated increase in rents and housing prices. If a housing shortage does develop, it is not likely to persist beyond the end of WIPP construction. The total demand for housing will decrease in 1984 as one phase of the project ends and another begins. Demand

would not rise again until 1986. The cumulative demand from 1980 to 1985 could be met at an annual rate of construction of 320 units per year.

Land Use

Using the housing-demand estimates above and an estimated average lot size for new housing units of 0.25 acre, one finds that about 300 acres will be required for new residential development from the start of 1978 through mid-1980. From 1980 through 1987, an additional 505 acres will be needed under baseline conditions. When compared with the currently vacant area, which is more than 7,500 acres, this eight-year cumulative demand of 805 acres clearly leaves ample surplus for commercial and industrial development as well as parks, streets, and other land uses.

It should be further noted that the existence of the 100-year-floodplain area will not seriously hinder the use of land for either baseline or WIPP induced housing construction. The floodplain area is already substantially developed. Moreover, most of the new construction is projected for the southern end of Carlsbad, which is not in the 100-year floodplain.

If the WIPP repository is begun in 1980, an additional 75 acres will be required for residential development through 1987, bringing the 8-year cumulative demand to 875 acres. During peak construction (1983) additional residential land use due to WIPP will be about 140 acres under the expected housing-type demand (more than 50% mobile homes). Given the availability of vacant land, the implementation of the project does not appear likely to cause any land-use problems in Carlsbad.

3.3.2.3 Scenario I: Loving

Housing

The projected baseline-population increases for Loving call for an addition of at least 69 housing units from the end of 1977 through mid-1980 (Table 3-14). This figure, which would decrease the vacancy rate to zero, is derived by subtracting the total occupied housing stock at the end of 1977 (393 units) from the occupied housing in mid-1980 (462 units). This represents an annual rate of increase of approximately 27 housing units per year. In order to maintain a 3% vacancy rate in mid-1980, about 71 units will be needed--an annual rate of 28 units per year. Under baseline conditions, 67 new housing units will be required from 1980 through 1987, or about 10 per year.

The WIPP repository will increase the cumulative 1980-1987 requirements by 17 units, bringing the annual rate up to 12 units per year for the seven years. While the peak year (1983) demand will be as high as 41 units, since more than half of that demand will be for mobile homes, it does not appear that there will be any major difficulty in meeting new housing requirements through 1987, with or without the WIPP project.

Table 3-14. Annual Housing Demand for Scenario I: Loving

Year	Occupied housing		Change from previous year		Occupied housing plus 3% vacancy rate		Change from previous year	
	Baseline	With WIPP	Baseline	With WIPP	Baseline	With WIPP	Baseline	With WIPP
1977	393	--	--	--	405 ^a	--	--	--
1978 ^b	429	--	36	--	443	--	38	--
1979	444	--	15	--	458	--	15	--
1980 ^c	462	465	18	21	476	479	18	21
1981	465	477	3	12	479	491	3	12
1982	482	520	17	43	496	536	17	45
1983	483	524	1	4	498	540	2	4
1984 ^d	499	515	16	(9)	514	530	16	(10)
1985	514	525	15	10	530	541	16	11
1986	514	530	0	5	530	546	0	5
1987	529	546	15	16	545	561	15	15

^aEstimated year-end occupied units.

^bFigures for 1978 and subsequent years are mid-year.

^cBeginning year of construction. Impact assumed to be static after 1986.

^dParentheses indicate negative amount.

Loving, like Carlsbad, will have an excess of housing units in 1984 because of a lag between the end of WIPP construction and the beginning of full operations (Table 3-14). However, this decrease in demand will be extremely short-lived, lasting less than a year.

Land Use

Using the present average lot size of 0.5 acre, the projected cumulative housing additions through 1987 will require about 35 acres under baseline conditions and approximately 43 acres with the WIPP project. If the lot size of new homes is 0.25 acre, 17 acres will be required without and 21 acres with the repository.

Table 3-15 shows the WIPP-related housing demand by type. The pattern is the same as that projected for Carlsbad: during construction, there will be a greater demand for mobile homes and multifamily units, while during operation there will be a greater demand for single-family units.

Table 3-15. Annual WIPP-Induced Housing Demand for Scenario I by Type of Dwelling: Loving^a

Year	Total	Permanent single family	Permanent multifamily	Mobile homes and others
1980	3	1	0.3	1.7
1981	12	4	1	7
1982	38	13	4	21
1983	41	14	4	23
1984	16	5	2	9
1985	11	4	1	6
1986	16	5	2	9
1987	17	5	2	10

^aThe allocation of total demand to housing types is based on the housing preferences of construction workers and other newcomers in Construction Worker Profile (Old West Regional Commission, 1975).

There are an estimated 320 acres of vacant land inside the current Loving city limits. Most of this land is used for agricultural purposes. Land adjoining the corporate boundaries is also used primarily for agriculture. Because a large proportion of land inside and contiguous to the city limits is presently vacant, the community of Loving should experience no land-use problems with respect to the quantity of land which could be used for residential units, with or without the WIPP project.

3.3.2.4 Scenario II: Hobbs

Housing

The projected baseline-population increases for Hobbs call for an addition of at least 770 housing units from the end of 1977 through the middle of 1980 (Table 3-16). This figure, which would drop the vacancy rate to zero, is derived by subtracting the total housing stock at the end of 1977 (10,880 units) from the occupied housing in mid-1980 (11,650 units). This represents an annual rate of about 310 units for the 2.5-year period, or about 52% of the record addition of more than 600 units in 1977.

To maintain a 3% vacancy rate in mid-1980, about 1,130 units will be needed, or 450 per year. Under baseline conditions, 2,470 new housing units will be needed from 1980 through 1987, or about 355 per year, a rate well below that for 1977.

The WIPP repository will increase the cumulative 1980-1987 requirements by 130 units, bringing the annual rate up to 370 units for the seven years; this rate is less than those achieved in either 1976 or 1977. Although it does not appear that there will be any difficulty in meeting the projected new-housing requirements through 1987, the current extremely high interest rates on mortgage loans could exert an adverse effect. The continuation of present (12-15%) interest rates into 1981 would probably reduce housing starts and create some short-term shortages. However, it is difficult to predict the long-term effects of present mortgage-loan rates on housing construction. Other types of housing, such as mobile homes, could conceivably be used to cover any shortages that might occur because of a tight mortgage-loan market.

Table 3-17 indicates the WIPP-induced housing demand by type. The pattern is the same as that projected for Carlsbad; mobile homes and multifamily units being preferred during construction and single-family units being preferred during operation.

Land Use

Using the present average lot size of one-seventh of an acre, the projected cumulative housing additions through 1987 would require about 460 acres under baseline conditions and about 480 acres with the WIPP. However, if the lot size of new homes is one-quarter acre, approximately 810 acres will be required without, and 840 acres with, the WIPP project. During peak construction (1983) an additional 60 acres will be required for residential land use under the expected distribution of housing-type demand (more than 50% mobile homes).

Excluding land in the Hobbs Industrial Air Park, there are an estimated 1,070 acres of vacant land inside the current Hobbs city limits, primarily in the north end of town. Thus there is more vacant land than will be required for the new housing units alone. There is some question, however, about the

Table 3-16. Annual Housing Demand for Scenario II: Hobbs

Year	Occupied housing		Change from previous year		Occupied housing plus 3% vacancy rate		Change from previous year	
	Baseline	With WIPP	Baseline	With WIPP	Baseline	With WIPP	Baseline	With WIPP
1977	10,660 ^a	--	--	--	10,880 ^b	--	--	--
1978 ^c	10,890	--	230 ^d	--	11,230	--	350 ^d	--
1979	11,300	--	410	--	11,650	--	420	--
1980 ^e	11,650	11,670	350	370	12,010	12,030	390	--
1981	12,090	12,180	440	510	12,470	12,560	430	530
1982	12,430	12,710	340	530	12,820	13,110	350	550
1983	12,810	13,130	380	420	13,210	13,540	390	430
1984	13,200	13,340	380	210	13,600	13,750	400	210
1985	13,600	13,690	400	350	14,020	14,110	420	360
1986	13,870	13,990	270	300	14,300	14,420	280	310
1987	14,120	14,250	250	260	14,550	14,690	260	270

^aEstimated year-end occupied units.

^bActual year-end housing stock, City of Hobbs Housing Count, 1978.

^cFigures for 1978 and subsequent years are mid-year.

^dSix-month change.

^eBeginning year of construction. Impact assumed to be static after 1986.

Table 3-17. Annual WIPP-Induced Housing Demand for Scenario II
by Type of Dwelling: Hobbs

Year	Total ^a	Permanent single family	Permanent multifamily	Mobile homes and other
1980 ^b	20	5	5	10
1981	90	30	10	50
1982	280	95	30	155
1983	320	110	35	175
1984	145	50	15	80
1985 ^c	90	50	10	30
1986	120	80	10	30
1987	130	105	5	20

^aTotal housing demand based on population migration projections resulting from direct and indirect jobs (Table 3-2). Detail does not sum to total because of rounding.

^bAllocation of total demand from 1980-1984 based on housing demand for construction workers in Construction Worker Profile (Old West Regional Commission, 1975).

^cAllocation of total demand for housing types from 1985-1987 based on averages of distinct housing-type demands of construction workers and long-term residents.

ability of the vacant area to accommodate new housing and new commercial and public development. Currently, there is an average of 1.25 occupied acres for every housing unit in Hobbs. If this average acreage is to be maintained, the projected housing additions (3,370 units)* will require about 4,200 acres, or about four times the available vacant area. While it is not suggested that actual nonresidential land requirements grow in direct proportion to those for residential purposes, it is probable that some of the currently vacant land will be used for nonresidential purposes. As a result, it is possible that there will be little or no vacant land remaining inside the current city limits of Hobbs by the late 1980s.

*For 1977 to mid-1980, 770 housing units; for mid-1980 to mid-1987, 2,470 (baseline) plus 130 WIPP-induced housing units. This, in turn, may prompt expansion of the city limits, an action that must be initiated by petition from the residents or landowners in the annexed area. Any development outside the current city limits will most likely take place to the north of Hobbs. Land to the east and south of the city is owned by three individuals who are currently unwilling to sell, while the west is constrained by oil and gas-field developments.

To some extent, this increasing scarcity of land may cause some of the housing development projected for Hobbs to take place outside the city limits.

3.3.3 Community Services and Facilities

3.3.3.1 Scenario I: Carlsbad and Eddy County*

Education: Carlsbad School District

Projections of school enrollments indicate that excess physical capacity will continue to characterize the Carlsbad school system. The 1986-1987 school-year enrollment will require approximately 72% of the available classroom space (Table 3-18). Overall, the student population should increase by about 15% (about 950 students) during the decade from 1976-1977 to 1986-1987. The principal effect of the WIPP repository will be to accelerate the rate of increase in enrollment, with maximum impact in the 1983-1984 school year of 4.8% (approximately 325 students) over baseline conditions.

The 10-year increase is projected to be 18% (about 1,075 students). This accelerated rate of student-population growth, however, will not tax the capacity of the school system. The 1986-1987 enrollment level with the WIPP will require less than 74% of the current classroom space.

Increased enrollments may require additional teachers, although it is possible to allow the student-to-teacher ratio to rise. Maintaining the current student-to-teacher ratio would require about 50 additional teachers under baseline conditions by 1986-1987 and about 59 with the project. Requirements for administrative and staff personnel will probably grow as well, but not necessarily as rapidly as enrollment. Because enrollments with the WIPP are projected to be only marginally larger than those without the WIPP, they may not result in any increase in demand for administrative and staff personnel.

During the 1977-1978 school year, the Carlsbad school district reopened an elementary school in the south portion of the city, an area of high potential population growth. Thus a facility shortage in that part of the city has been alleviated.

The WIPP repository is not likely to cause any overlapping problems at any grade level in the Carlsbad school system.

*Section 3.3.3.1 presents selected analyses of impacts that have related effects on Carlsbad and Loving. Section 3.3.3.2 analyzes the impacts that can be identified as being specific to Loving.

Table 3-18. Current and Projected Yearly Enrollments:
Carlsbad School District^a

Year	Grade				Total
	K-6 ^b	7-8	9-10	11-12	
BASELINE					
1979-1980 ^c	3,568	981	1,097	1,000	6,646
1980-1981 ^d	3,612	980	1,024	974	6,590
1981-1982	3,731	998	1,035	899	6,663
1982-1983	3,881	898	1,022	830	6,631
1983-1984	4,092	834	1,019	825	6,770
1984-1985	4,204	886	927	819	6,836
1985-1986	4,364	963	865	825	7,017
1986-1987	4,511	1,029	930	753	7,223
1987-1988	4,641	1,099	1,010	704	7,454
1988-1989	4,734	1,168	1,079	758	7,739
WIPP SCENARIO I					
1980-1981 ^d	3,655	990	1,033	983	6,661
1981-1982	3,879	1,032	1,067	928	6,906
1982-1983	4,125	956	1,075	878	7,034
1983-1984	4,286	881	1,062	863	7,092
1984-1985	4,306	912	950	839	7,007
1985-1986	4,458	987	886	843	7,174
1986-1987	4,624	992	955	775	7,346

^aDetail may not equal total because of rounding.

^bIncludes special education; kindergarten students counted as full time.

^cCarlsbad Forty-day Average Daily Membership.

^dStart of construction.

Groundwater and Municipal Water System

The city of Carlsbad has sufficient water rights for the next several decades. Table 3-19 contains projected withdrawals and depletions* for Carlsbad with and without the WIPP project. Baseline withdrawals are expected to rise from the 1977 level of 8,800 acre-feet to 10,950 by 1987 and 13,250 by 2000. Implementation of the project will increase demand by as much as 6% during construction and 2% in subsequent years.

Table 3-19. Acre-feet of Annual Water Demand: Carlsbad^a

Year	Annual Water Demand			
	Baseline		With WIPP	
	Withdrawals	Depletions	Withdrawals	Depletions
1970	7,100 ^b	3,500 ^b		
1977	8,800 ^c	5,000 ^d		
1980 ^e	9,400 ^d	5,600	9,400	5,600
1981	9,600	5,800	9,750	5,900
1982	9,950	6,050	10,000	6,350
1983	10,050	6,100	10,650	6,450
1984	10,250	6,250	10,550	6,450
1985	10,450	6,400	10,600	6,500
1986	10,700	6,600	10,950	6,750
1987	10,950	6,800	11,200	6,950
1988	11,250	7,000	11,500	7,150
2000	13,250	8,650	13,550	8,800

^aPeak consumption load in 1979, 16 mgd; in the year 2000: baseline, 24 mgd; with WIPP, 25 mgd.

^bData from the New Mexico Interstate Stream Commission and New Mexico State Engineer Office (1975); County Profile, Eddy County.

^cData from the City Manager's Office, Carlsbad, New Mexico.

^dBased on population projections made in this study and per-capita withdrawal and depletion projections by the New Mexico Interstate Stream Commission, adjusted for actual withdrawals in 1977.

^eStart of construction.

*The term "depletion" refers to the part of the withdrawn water that is no longer available because it has been evaporated, transpired, incorporated into products or crops, consumed by people or livestock, or otherwise removed from the water environment.

Municipal Wastewater Systems and Treatment Facilities

The new sewage-treatment plant now being constructed will be capable of serving a population of 50,000. Because its design capacity is well over projected population levels (with or without the WIPP) through the end of this century, the new plant should be adequate for the needs of Carlsbad for the next several decades.

The present sewer system will have to be extended into areas of new housing development. Moreover, population increases will result in increased wastewater flows through existing main sewer lines. City officials have indicated that the existing main sewer lines can handle projected increases (with or without the WIPP) through the year 2000.

Electric Service

Projected occupied-housing additions to the Carlsbad-Loving area under baseline conditions total 2,840 from 1978 through mid-1987. By mid-1987, this will result in a 6.4% increase in total electricity use over current levels if current rates of use continue. Moreover, new commercial hookups will be required by the end of 1986, causing an additional increase of 5.9% over current levels of electricity use.

The WIPP project will result in about 3,157 new housing units between 1978 and 1987, with a 7.1% increase in electricity use. Commercial use will add about 6.5%. The net effect of the repository will be to increase the residential and commercial use of electricity by less than 2% by mid-1987. Total electricity use will be up about 1% as a result.

The WIPP itself will require as much electricity as many of the large industrial users in the area. Its demand level will be about one-tenth that of an ammonia plant that recently closed. The closing of the ammonia plant in effect created sufficient excess generating capacity to cover about 10 times the projected WIPP demand. According to officials of the Southwestern Public Service Company, the generating capacity will be sufficient for the projected demand. However, new distribution substations will be required, and there is a lead time of three to six months for new hookups.

Natural-gas Service

Under baseline conditions, the housing demands projected through 1987 for the Carlsbad area show that residential hookups will increase 28.9% over current levels. At current consumption rates, this will increase the consumption of natural gas by 4.5%. Increased commercial use will raise consumption by another 1.7%.

The WIPP will increase the residential consumption of natural gas by 4.9%. Commercial use will rise 1.8% above current levels by the end of 1987. As a result of the WIPP, gas consumption will be about 0.5% above baseline levels in 1987.

Gas Company of New Mexico officials believe that these increases, with or without the WIPP project, can be met without difficulty.

Fire Protection

To maintain current levels of fire protection in 1987, Carlsbad will need 36 full-time fire-department employees under baseline conditions and 38 employees with the WIPP. These are increases of six and eight employees, respectively, from the 1979 level. Two additional pieces of major equipment will be needed in 1987, either with or without the WIPP. Without the project, the one airport and three nonairport substations will provide sufficient coverage in 1987. However, the growth of the city with the WIPP will require an additional fire substation by 1987. The principal impact of the WIPP will thus be to require additional personnel and equipment at an earlier date.

Police Protection

Under baseline conditions, the number of police employees will have to increase from 48 to 57 in 1987 to maintain the current ratio of police employees to city inhabitants. The WIPP repository will create the need for three more police employees (a total of 60 in 1987). Five additional Eddy County Sheriff's Office employees will be needed in 1987. The WIPP is not expected to create any conditions that would significantly change the required number of Sheriff's Office employees. The implementation of the WIPP will change the times when additions to the police and sheriff's departments are needed.

Health Care

To maintain current service levels, Eddy County will require 189 hospital beds by mid-1987 under baseline conditions and 196 with the WIPP. If occupancy rates are allowed to rise over current levels and if the per-capita demand for hospital beds remains unchanged, the 1987 baseline county population can be accommodated with about 147 beds. With the WIPP, about three more beds will be required. The resulting increase in occupancy rates will bring countywide occupancy to about 88% (90% with the WIPP). Thus, current hospital facilities appear to be adequate to meet demand through the 1980s if occupancy rates are allowed to rise. Moreover, the Guadalupe Medical Center has several double rooms that currently contain only one bed. The number of beds can therefore be increased fairly readily, bringing occupancy rates down.

The number of primary-care physicians required at current service levels will be 24 by mid-1987 under baseline conditions and 25 with the WIPP. This will leave the physician-to-population ratio below that recommended by Bennett (1977). Under Bennett's standard of one primary-care physician per 1,200 people, the WIPP will increase the demand for primary-care physicians by about one.

Projected population levels for 1987 call for one additional ambulance under baseline levels. The WIPP will not add to this requirement.

Traffic and Transportation

Access to the site will be provided by a road connecting the site to U.S. 62-180 to the north; a road to the south connecting with N.M. 128 is also planned; however, the main traffic flow is expected to be from the north. There may be temporary minor disruptions of traffic on U.S. 62-180 and N.M. 128 while the access roads are being connected. Site construction itself will be several miles from the public roads and should therefore cause no disruption of traffic flows or patterns.

During construction and operation, there will be some increase in traffic on U.S. 62-180 between the site access road and Carlsbad. However, since present plans call for some workers to be bused to the site during all of the project's phases, the traffic-volume increase will be minimal. Since U.S. 62-180 is a four-lane highway, slow-moving buses will not impede other traffic.

Figure 3-1 indicates the 1978 traffic volume for selected locations in Carlsbad. Table 3-20 presents peak traffic flows and street capacities for several of these locations. Currently, traffic flows are well within the existing capacity of the street system (Table 3-20).

Table 3-20. Selected Traffic Flows and Road Capacities: Carlsbad

Site ^a	Street	Average daily traffic, 1978 ^b	Peak hour (4-5 p.m.) 1978 ^c	Projected peak hour, 1987 ^d		Peak-hour capacity ^e
				Baseline	WIPP	
A	Canal Street	7,772	710	850	870	1,900
B	Canal Street	16,792	1,530	1,840	1,880	1,900
C	U.S. 285	15,985	1,460	1,750	1,800	2,900
D	San Jose Boulevard	3,446	310	370	380	950
E	Mermod Street	7,314	670	810	830	1,900
F	Texas Street	1,865	170	210	220	950
G	Lea Street	2,356	210	250	260	950
H	U.S. 62-180	4,681	430	520	600 ^f	2,900

^aSee Figure 3-1.

^bData from the New Mexico State Highway Department (1978), Traffic Flow Maps of Urban Areas.

^cBased on percentage hourly loads; data from the New Mexico State Highway Department (1969), Carlsbad Traffic Study.

^dAssumes increase in proportion to population increase. See text.

^eBased on street-capacity estimating procedures used by the Middle Rio Grande Council of Governments.

^fAssuming travel from the site is during the peak hour and an average of two occupants per vehicle. Comparable figure for the peak construction year (1983) is 850.

Figure 3-1. Carlsbad average daily traffic, 1978.

Projections of 1987 peak traffic flows are presented in Table 3-20; they are based only on projected population increases, with and without the WIPP, and not on the location of new housing developments. The only location where capacity is reached is site B on Canal Street. This is in the downtown business district, where the population-based projection is probably reasonably accurate. The other sites are feeder routes from expected new population centers to the downtown area. They are thus likely to receive impacts greater than those indicated in Table 3-20. Most, however, have considerable excess capacity.

On a subjective basis, it appears that the location of new housing will cause the most severe impact on San Jose Boulevard and Boyd Drive. (No traffic counts are available for Boyd Drive.) The extent of the impact is impossible to predict, however, since it depends primarily on the location of the place of work of residents in new homes. (For those working in the potash mines or at the site, it depends on the location of bus pickup points). The place of work is of primary importance since about 50% of all trips with origins or destinations in Carlsbad are for work purposes.

Communication Services and Facilities

Under baseline conditions, by 1987 the number of telephone main stations in service will increase by about 3,400, or about 28% over the 1978 year-end level. With the WIPP project, the increase will be about 3,800, or 31%. As a result, the net effect of the WIPP will be to raise the demand for telephone service about 2% above baseline levels.

General Telephone of the Southwest is anticipating the completion of a new central office with automated switching in late 1979 or early 1980. Company officials state that this office will provide ample capacity to meet projected demands with or without the WIPP.

Recreation

Impacts on most community recreation facilities are difficult, if not impossible, to quantify for several reasons. First, recreation, particularly outdoor recreation, uses a much larger area than the city limits. Second, the information available from government agencies (the state of New Mexico in conjunction with the Bureau of Outdoor Recreation, an agency of the U.S. Department of the Interior) that monitor capacity and use is limited to multi-county areas known as Recreational Market Areas (RMAs). Third, people who migrate to the area may not have the same recreational interests as those who already live there.

The New Mexico State Planning Office defines seven RMAs, with RMA 6 covering the counties of Chaves, Eddy, Lea, Lincoln, and Otero. Analysis of recreational facilities and use patterns for this RMA indicates that facilities for two popular outdoor recreational activities, camping and pool swimming, will be insufficient by 1985 if present capacities are not increased.

Popular RMA activities that appear to have adequate facilities through the year 2000, given the population growth with and without the WIPP, are fishing (lake and stream), picnicking, tennis, and golf.

Demand for new swimming pools in Carlsbad is likely to develop in the next few years. The city currently has an adequate supply of city parks and recreational facilities in the Presidents' Park and Carlsbad Lake complex.

Indoor recreational activities are generally sponsored by the private sector. One major exception is recreation for senior citizens. The city of Carlsbad already provides a program to meet this demand, and it is expected that the WIPP repository will not significantly increase the demand in this category. Moreover, since the overall WIPP impact on the population of Carlsbad is only about 6% of the total population in the peak impact year (1983), no significant problems with indoor recreational facilities are expected.

Solid-waste Management

The projected baseline increase in the population indicates that two additional vehicles will be needed to collect refuse in 1987. With the repository, three additional vehicles will be needed in 1987.

With an estimated remaining life of 30 years, the landfill in Carlsbad has enough capacity (even with the WIPP) to meet the needs of the city until after the year 2000.

3.3.3.2 Scenario I: Loving

This section presents analyses of the impacts that can be identified as being specific to Loving. Analyses of selected impacts that have related effects on Carlsbad and Loving are presented in Section 3.3.3.1.

Education--Loving School District

School-enrollment projections indicate that the municipal schools of Loving will still have excess capacity in all grades by mid-1987 with or without the WIPP project (Table 3-21). Under baseline conditions, the school district's enrollment will increase by approximately 13% (29 students). Under the assumptions of Scenario I, enrollment will increase approximately 15% (35 students). Thus the WIPP project will cause a rise of only 2% (6 students) in the overall student population; however, during the peak year (1983), an increase of 10 students over baseline projections is expected.

Table 3-21. Current and Projected Yearly Enrollments:
Loving School District

Year	Grade		Total
	K-6 ^a	7-9	
ENROLLMENT CAPACITY			
	288	140	428
BASELINE			
1979-1980 ^b	223	119	342
1980-1981 ^c	230	122	352
1981-1982	233	124	357
1982-1983	236	126	362
1983-1984	239	128	367
1984-1985	245	131	376
1985-1986	248	133	381
1986-1987	252	134	386
1987-1988	258	138	396
1988-1989	264	141	405
WIPP SCENARIO I			
1980-1981 ^c	232	122	354
1981-1982	241	126	367
1982-1983	248	130	378
1983-1984	249	132	381
1984-1985	250	133	383
1985-1986	252	135	387
1976-1987	258	136	394

^aIncludes special education; kindergarten students counted as full time.

^bLoving Forty-day Average Daily Membership.

^cStart of construction.

Groundwater and Municipal Water System

Water withdrawals in Loving are projected to increase from the current 280 to 490 acre-feet per year in 2000 under baseline conditions (Table 3-22). The WIPP will add about 19 acre-feet to water demand in the peak impact year of 1983. In 1988, the WIPP will add nine acre-feet to annual demand. Total demand in the year 2000 with the WIPP will be 500 acre-feet, considerably less than current water rights of 800 acre-feet per year.

If current use patterns continue into the future, peak day demand should reach system capacity in 1993 under baseline conditions. With the WIPP this will occur in 1992.

Table 3-22. Acre-feet of Annual Water Demand: Loving^a

Year	Annual Water Demand			
	Baseline		With WIPP	
	Withdrawals	Depletions	Withdrawals	Depletions
1978 ^b	279	186 ^c		
1980 ^d	300 ^c	200	300	200
1981	300	200	310	200
1982	320	210	340	220
1983	320	210	340	220
1984	330	220	340	230
1985	350	220	350	230
1986	350	230	360	230
1987	360	240	370	240
1988	370	240	380	250
2000	490	310	500	310

^aPeak consumption in 1979, 500,000 gpd; in the year 2000: baseline, 880,000 gpd; with WIPP, 900,000 gpd.

^bData from Molzen-Corbin and Associates, Consulting Engineers.

^cEstimates based on population projections by this study and per-capita withdrawal and depletion projections from the New Mexico Interstate Stream Commission and the New Mexico State Engineer Office, County Profile, Eddy County, adjusted for actual 1978 withdrawals.

^dStart of construction.

Municipal Wastewater Systems and Treatment Facilities

The current demand on Loving's sewage-treatment plant uses approximately 55% to 60% of the plant's capacity (Adcock, 1979). The population increase projected to result from the WIPP project (Section 3.2.1) is not expected to create excess demand beyond the plant's current capacity. However, because the present plant does not meet the current effluent standards of the New Mexico Water Quality Commission, any increase in population will serve to aggravate the present effluent-quality problems until a new plant, which is being planned for construction if funds become available, is completed.

Electric Service

Because the Southwestern Public Service Company's service area includes both Carlsbad and Loving, the impacts for Loving are covered by the discussion for Carlsbad (Section 3.3.3.1).

Natural-gas Service

The housing demands projected for the Loving area through 1987 under baseline conditions indicate that residential hookups will increase 19% over current levels. At current consumption rates, this will increase the consumption of natural gas by 6%. Increased commercial use will raise consumption an additional 1.3%.

The WIPP project will increase residential and commercial use by 15.3% and 1.9%, respectively, by the end of 1987. As a result, gas consumption will be about 2% above baseline levels in 1987.

Officials of the Gas Company of New Mexico believe that these increases, with or without the WIPP project, can be met without difficulty.

Fire Protection

To maintain the current levels of fire protection in 1987, Loving will need to purchase one additional piece of major equipment to replace aging vehicles. No new personnel will be needed. The WIPP project should not add to this requirement.

Police Protection

Under baseline conditions or with the WIPP project the number of police employees will not increase if the current ratio of police officers to city inhabitants is maintained.

Recreation

Under baseline conditions no additional recreational facilities should be needed by 1987. Neither the construction nor the operation of the WIPP repository should affect recreation requirements.

Communications Services and Facilities

Under baseline conditions, the number of telephone main stations in service by 1987 will increase by approximately 125, or about 23% over the 1976 year-end level. With the WIPP repository, the increase will be about 147, or 27%. The net effect of the WIPP project will be to raise demand for telephone service 3% above baseline levels.

Health Care

To maintain current service levels, the El Centro Rural de Salud clinic should require no additional personnel or facilities either under baseline conditions or with the WIPP project. Short-term hospitalization is available in Carlsbad.

Traffic and Transportation

Under baseline conditions the traffic and transportation aspects of the Loving area are expected to remain at normal service levels. Some increase in traffic due to population growth will occur in the area. The WIPP facility will increase highway traffic only slightly. To the extent that facility employees locate in Loving or to the south of Loving, minimal increase in traffic along U.S. 285 may occur.

Solid-waste Management

The projected baseline increase in the population indicates that one new vehicle will be needed to collect refuse in 1987. With the repository this requirement should not change.

The present Loving landfill is expected to be filled in approximately 30 years. With the WIPP project, it will reach capacity two months earlier.

3.3.3.3 Scenario II: Hobbs and Lea County

Education--Hobbs School District

School-enrollment projections indicate that the Hobbs municipal schools will experience crowding in all grades by the early to mid-1980s (Table 3-23). Classroom capacity will be particularly strained in grades K through 6 by 1982-1983. Under baseline conditions, the average class will exceed 24 students in the 1983-1984 school year. Under the assumptions of Scenario II, this increase in class size will happen one year earlier. By the 1986-1987 school year, the average class will have more than 27 students under baseline conditions and somewhat more students with the WIPP.

To alleviate the projected overcrowding, new classroom space will be needed by the beginning of the 1986-1987 school year. This capacity could take the form of an entirely new elementary school, classrooms added on to

Table 3-23. Current and Projected Yearly Enrollments:
Hobbs School District

Year	Grade			Total
	K-6	7-9	10-12	
ENROLLMENT CAPACITY ^a				
	4,630	1,990	1,730	8,350
BASELINE				
1979-1980 ^b	4,231	1,799	1,753	7,783
1980-1981	4,239	1,748	1,763	7,750
1981-1982	4,274	1,789	1,696	7,759
1982-1983	4,334	1,815	1,631	7,780
1983-1984	4,519	1,702	1,589	7,810
1984-1985	4,703	1,602	1,627	7,932
1985-1986	4,885	1,538	1,654	8,077
1986-1987	5,004	1,619	1,546	8,169
1987-1988	5,090	1,717	1,444	8,251
1988-1989	5,142	1,804	1,371	8,317
WIPP SCENARIO II				
1980-1981 ^c	4,257	1,754	1,768	7,779
1981-1982	4,338	1,811	1,714	7,863
1982-1983	4,440	1,853	1,661	7,954
1983-1984	4,604	1,733	1,613	7,950
1984-1985	4,748	1,620	1,639	8,007
1985-1986	4,926	1,554	1,665	8,145
1986-1987	5,053	1,638	1,560	8,251

^aEstimated capacity, assuming 24 students per classroom.

^bData from Ray Wasson, Assistant Superintendent for Personnel, Hobbs Municipal Schools, personal interview, 1979.

^cStart of construction.

existing schools, or the use of modular classrooms at existing elementary school sites. Any of these alternatives would either reduce or alleviate the projected overcrowding.

It should be emphasized that the additional classroom capacity will be necessary with or without the WIPP project. The inclusion of WIPP dependents into the system would only exacerbate the problem.

Groundwater and Municipal Water System

With rights to just more than 18,800 acre feet per year, Hobbs has sufficient water rights to cover anticipated demand until well past the year 2000. As shown in Table 3-24, withdrawals are projected to be 10,500 acre-feet in 2000 under baseline conditions. With the implementation of the WIPP, an additional 80 acre-feet would be required that year. The greatest impact would occur in 1983, with an additional demand of 175 acre-feet per year.

Table 3-24. Acre-feet of Annual Water Demand: Hobbs^a

Year	Annual water demand			
	Baseline		With WIPP	
	Withdrawals	Depletions	Withdrawals	Depletions
1970 ^b	6,800	3,100		
1977 ^c	6,950	3,850		
1980 ^d	7,250	4,350	7,250	4,350
1981	7,500	4,500	7,550	4,550
1982	7,700	4,650	7,850	4,750
1983	7,900	4,800	8,050	4,900
1984	8,150	5,000	8,200	5,050
1985	8,350	5,100	8,400	5,150
1986	8,550	5,250	8,650	5,300
1987	8,750	5,400	8,850	5,450
1988	8,900	5,500	8,950	5,550
2000	10,500	6,850	10,550	10,600

^aPeak consumption (based on peak-day factors), in 1977, 14 mgd; in the year 2000: baseline, 20.9 mgd; with the WIPP 21.0 mgd.

^bData from the New Mexico Interstate Stream Commission and the New Mexico State Engineer Office (1975); County Profile, Lea County.

^cEstimates based on population projections by this study and per-capita withdrawal and depletion projections by the New Mexico Interstate Stream Commission, adjusted for the recent water-rate increase.

^dStart of construction.

Although water rights are adequate for several decades, the 14-mgd current yield of the 28 existing wells is only slightly greater than the current peak-day demand. Peak-day demand is projected to exceed existing well yields in 1980. Unless additional wells are brought into production, there may be some temporary water shortages in the mid-summer of 1980, with the shortages becoming worse in succeeding summers. The WIPP project would increase the shortfall somewhat.

Municipal Wastewater Systems and Treatment Facilities

With an anticipated wastewater flow of 79.5 gallons per capita per day, an average of 2.88 mgd of wastewater will be generated in 1983 under baseline conditions. By 1990 this will rise to 3.3 mgd. With the WIPP, wastewater flows would reach 2.9 mgd in 1983 and 3.31 mgd in 1990. Since the capacity of the sewage treatment plant under construction is about 5 mgd, with expansion to 6 mgd possible, there should be no problems with sewage treatment, with or without the WIPP, for the next several decades.

New main sewer lines, replacing or supplementing several existing main lines, will provide service from the north side of town, the area of anticipated population growth, to the sewage-treatment plant on the south side of town. As a result, no problems should be experienced in delivering wastewater to the treatment plant, with or without the WIPP.

The foregoing analysis assumes that all projected population increases in Hobbs actually occur within the city limits. However, as indicated in Section 5.3.2.4, there is a high probability that the current city limits will be unable to accommodate all of the projected population increase. In fact, much of the recent growth in the Hobbs area has taken place outside the city limits to the north. If future growth does occur in this area and the new housing units are not connected to the municipal sewer system, it will be necessary to use septic systems. Since conventional septic systems have presented problems with seepage into groundwater, it is necessary to use the somewhat more expensive evapotranspiration systems. This, in turn, will mean a slight increase in housing costs.

Electric Service

By mid-1987, residential consumption of electricity will increase by 4.9% over 1978 year-end levels, with 0.9% attributable to the WIPP. If the current ratio of commercial to residential use is maintained, commercial use will require an additional 4.6%. The net effect of WIPP-induced residential and commercial use of electricity will be an increase of 0.29%.

Natural-gas Service

The housing demands projected for the Hobbs area in 1987 under baseline conditions indicate that residential hookups will increase 30% over current levels. At current consumption rates, this will increase natural gas consumption by 18.7%. Increased commercial use will raise consumption an additional 8%.

The WIPP project will increase the residential and commercial consumption by 19.7 and 8.3%, respectively, by the end of 1987, or by about 1% above baseline levels.

According to Hobbs Gas Company officials, the projected expansion of natural-gas service, with or without the WIPP project, can be accommodated without difficulty.

Fire Protection

Without the WIPP, the Hobbs fire department will have to increase from 44 employees in 1978 to 55 in 1987 in order to maintain the current ratio of fire-department employees to city inhabitants. The WIPP is expected to increase the number of employees needed by one. By 1987 the number of major fire-equipment units and substations will have to increase by 2 and 1, respectively, if the current level of fire protection is to be maintained. The WIPP is not expected to alter that increase significantly.

Police Protection

An additional 20 police employees, an increase of 24.6%, will be needed in Hobbs by 1987 under baseline conditions, in order to maintain the current level of service. With the WIPP, the number of additional employees needed will be 22, or two employees more than the number needed under baseline conditions.

Under baseline conditions, the Lea County Sheriff's Office will need an additional six employees. With the WIPP project, the needed increase is expected to be one additional employee.

Health Care

Projected population increases for Lea County to mid-1987 will increase the requirements for hospital beds to 100 under baseline conditions and current use rates. With the WIPP, the demand will rise to 101. Occupancy rates will rise to about 55% and 56%, respectively, well below the recommended level of 80% (Bennett, 1977).

Medical-personnel requirements in 1987 will be about 1% greater with the WIPP than without. If current levels of primary-care physician to population are maintained, this means a WIPP-related increase of 0.3 physician. If the standard proposed by Bennett is used, the WIPP-induced population change in 1987 will result in the need for 0.5 extra primary-care physician. Overall, the WIPP will raise personnel requirements by less than 1% and will not increase capital facility requirements measurably. Ambulance requirements will rise to five vehicles with or without the WIPP.

Traffic and Transportation

Access to the WIPP site from Hobbs will be on U.S. 62-180. Since this highway is well below peak-hour capacity, commuting by WIPP employees is not expected to have any significant impact.

Figure 3-2 indicates selected 1978 traffic flows for several locations in Hobbs. Table 3-25 presents peak traffic flows and street capacities for several of these locations. These projections are based on projected increases in population, with or without the WIPP, and should provide reasonably accurate results for the intracity traffic flows.

Table 3-25. Selected Traffic Flows and Road Capacities: Hobbs

Site ^a	Street	Average daily traffic 1978 ^b	Peak-hour traffic 1978 ^c	Project peak hour, 1987 ^d		Peak-hour capacity ^e
				Baseline	WIPP	
A	Turner	11,916	1,192	1,410	1,430	2,900
B	Grimes	11,372	1,137	1,340	1,370	1,900
C	Dal Paso	15,554	1,555	1,840	1,870	1,900
D	Bender	13,562	1,356	1,600	1,630	1,900
E	Turner	16,247	1,625	1,920	1,960	1,900
F	Dal Paso	16,769	1,677	1,980	2,000	1,900
G	Broadway	12,140	1,214	1,430	1,460	1,900
H	U.S. 62-180	5,868	587	690	730 ^f	1,900

^aSee Figure 3-2.

^bData from the New Mexico State Highway Department (1978), Traffic Flow Maps of Urban Areas.

^cAssumed to be 10% of the average daily traffic flow.

^dAssumes increase in proportion to population increase. See text.

^eBased on street-capacity estimating procedures used by the Middle Rio Grande Council of Governments.

^fAssuming travel from the site is during the peak hours and an average of two occupants per vehicle. Comparable figure for the peak construction year (1983) is 830.

The impact of future population growth is expected to be particularly heavy on streets connecting the north side of Hobbs to other parts of town. However, the only north-side locations that appear to have any serious potential for crowding are the intersections of Dal Paso and Turner with Sanger, both of which are expected to exceed capacity by 1987.

Peak flows are at or slightly above capacity under baseline conditions and would be marginally higher with the WIPP project. The intersection of Dal Paso with Bender will be approaching capacity in 1987 under either circumstance. The term "capacity" does not mean an absolute limit but rather that traffic movement is slowed as the capacity figure is approached. Thus, Turner and Dal Paso may experience some rush-hour problems by 1987, with the problems being slightly worse if the WIPP project is implemented. There may also be some evening-rush-hour traffic problems at some downtown locations, either with or without the WIPP.

Figure 3-2. Hobbs average daily traffic, 1978.

Communications Services and Facilities

With the WIPP project, about 3300 additional main stations will be required by mid-1987, an increase of 31% over the 1978 level and 1% over the baseline conditions.

General Telephone of the Southwest has recently installed a new exchange and plans additional installations in 1980 and 1981. It anticipates no difficulty in meeting projected demand with or without the WIPP.

Recreation

As stated in Section 3.3.3.1, outdoor recreation is generally measured over a larger area than municipal limits. In Regional Market Area 6 (RMA 6), which includes Chaves, Eddy, Lea, Lincoln, and Otero Counties, demands for camping and swimming-pool facilities may not be met by 1985. However, the lack of swimming pools as measured on an RMA-wide basis may not apply to the city of Hobbs. Hobbs has four pools, two open to the general public and two available to private members only, and it appears that the demand will not exceed the supply by the year 1985. A large state park at the Hobbs Industrial Air Park, to be completed in 1983, will alleviate the current shortage of campsites within the RMA, particularly in the vicinity of Hobbs.

Peak impact on Hobbs is expected during 1983, at which time it is expected that overall recreational demands will be met.

Solid-waste Management

Two additional vehicles will be needed in Hobbs in order to meet the refuse collection needs in 1987. With the WIPP project the number of new vehicles needed will be essentially the same.

By 1982, five of the present collection vehicles will be more than seven years old. Therefore, it is projected that seven new vehicles will have to be purchased by 1987.

With an estimated remaining life of 30 years, the landfill in Hobbs has sufficient capacity (even with the WIPP project) to meet the needs of the city until after the year 2000.

3.3.4 Local Government Finances*

3.3.4.1 Scenario I: Carlsbad, Loving, and Eddy County

Carlsbad

In fiscal year 1982-1983, the year of maximum WIPP-construction impact on the population, Carlsbad municipal revenues are projected to reach \$12.1

*For an explanation of the techniques used in projecting revenues and expenditures, see Appendix A. Revenues and expenditures are rounded, where feasible, to the nearest \$0.1 million in this section.

million (in 1979 dollars) under baseline conditions (Table 3-26), or about \$380 on a per-capita basis. With the WIPP project, revenues will reach \$12.6 million in 1982-1983. The peak-year impact of the WIPP will add about \$0.6 million to Carlsbad revenues (Table 3-27).

The long-run operation of the WIPP will result in an additional \$0.3 million in annual municipal revenues. Total revenues without the project should reach \$13.7 million in 1988-1989, while those with the project should be \$14.0 million.

Carlsbad municipal expenditures are projected to be \$8.8 million in 1982-1983 under baseline conditions, while implementation of the WIPP should increase spending to nearly \$9.3 million. Thus, the WIPP will increase municipal expenditures by \$0.5 million in the year of peak impact.

By 1988-1989, Carlsbad expenditures are expected to reach \$9.7 million under baseline conditions and \$9.9 million with the WIPP, which would thus increase fiscal 1988-1989 spending by \$0.2 million.

As shown in Table 3-27 the net fiscal impact of the WIPP project is projected to be an excess of revenues over expenditures of nearly \$0.1 million in 1982-1983 and less than \$0.05 million in 1988-1989.

Loving

Loving revenues are projected to be \$320,000 in 1982-1983, or \$186 on a per-capita basis (Table 3-28). The WIPP project will produce an additional \$19,000 in revenues for Loving in that year (Table 3-29). In fiscal year 1988-1989, the WIPP will add about \$9,000 to the projected \$360,000 baseline revenue level.

Loving expenditures should be more than \$320,000 in 1982-1983 under baseline conditions. With the WIPP project they are projected to be nearly \$350,000, an increase of \$22,000. In 1988-1989, baseline expenditures are projected to be more than \$370,000. The WIPP project will add \$12,000 to this baseline amount.

Given the current fiscal situation for Loving, the net effect of the WIPP project will be to increase fiscal deficits slightly. The effect of these deficits is reflected in the increased debt service projected for Loving (Table 3-29).

Eddy County

Eddy County revenues are projected to reach \$5.8 million in fiscal year 1982-1983 under baseline conditions and \$6.0 million with the WIPP (Table 3-30). In 1988-1989, revenues should reach \$6.4 million without the project and nearly \$6.5 million with it. The peak impact of WIPP construction and operation will be to add \$0.13 million to revenues in 1982-1983 and less than half of that in 1988-1989 (Table 3-31). Expenditures for Eddy County are

Table 3-26. Baseline Municipal Finances: Carlsbad ^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Own source									
Taxes	690	710	730	740	760	770	790	810	830
Charges and miscellaneous	3,300	3,410	3,500	3,560	3,640	3,720	3,810	3,900	4,000
Intergovernmental transfers									
State	2,960	3,050	3,120	3,170	3,230	3,290	3,370	3,450	3,540
Federal	1,040	1,070	1,100	1,110	1,130	1,160	1,180	1,210	1,240
Other	<u>3,430</u>	<u>3,540</u>	<u>3,620</u>	<u>3,670</u>	<u>3,740</u>	<u>3,820</u>	<u>3,910</u>	<u>4,010</u>	<u>4,100</u>
TOTAL	11,420	11,780	12,060	12,260	12,500	12,760	13,060	13,390	13,720
EXPENDITURES (thousands of 1979 dollars)									
General government	1,190	1,230	1,260	1,280	1,300	1,330	1,360	1,390	1,430
Public safety	1,530	1,580	1,610	1,640	1,670	1,700	1,740	1,790	1,830
Public works	7,890	4,140	4,250	4,330	4,430	4,520	4,630	4,750	4,860
Health and welfare	60	60	60	60	60	70	70	70	70
Recreation and culture	760	780	800	810	830	850	870	890	910
Debt service	<u>760</u>	<u>810</u>	<u>810</u>	<u>810</u>	<u>900</u>	<u>800</u>	<u>620</u>	<u>620</u>	<u>620</u>
TOTAL	12,210	8,610	8,800	8,940	9,190	9,270	9,290	9,510	9,730

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

Table 3-27. Impact of the WIPP on Municipal Finances: Carlsbad^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Own source									
Taxes	6	22	39	34	20	16	18	19	20
Charges and miscellaneous	38	130	211	162	81	74	90	94	95
Intergovernmental transfers									
State	30	106	174	136	71	65	79	83	83
Federal	5	18	29	23	12	11	13	14	14
Other	<u>20</u>	<u>70</u>	<u>114</u>	<u>90</u>	<u>46</u>	<u>43</u>	<u>52</u>	<u>54</u>	<u>55</u>
TOTAL	99	346	567	445	231	209	251	265	266
EXPENDITURES (thousands of 1979 dollars)									
General government	12	43	70	55	28	26	32	33	34
Public safety	16	55	90	71	37	34	41	43	43
Public works	47	161	262	200	99	90	109	115	116
Health and welfare	1	2	4	3	1	1	2	2	2
Recreation and culture	<u>8</u>	<u>27</u>	<u>45</u>	<u>35</u>	<u>18</u>	<u>17</u>	<u>20</u>	<u>21</u>	<u>21</u>
TOTAL	83	288	470	363	184	169	204	214	216

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

Table 3-28. Baseline Municipal Finances: Loving ^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Own source									
Taxes	18	18	19	19	20	20	20	21	21
Charges and miscellaneous	162	165	168	170	176	178	181	186	191
Intergovernmental transfers									
State	46	46	47	48	49	50	51	52	53
Federal	18	18	18	19	19	19	20	20	21
Local	<u>63</u>	<u>64</u>	<u>65</u>	<u>66</u>	<u>68</u>	<u>69</u>	<u>70</u>	<u>72</u>	<u>74</u>
TOTAL	307	312	317	322	332	337	342	351	360
EXPENDITURES (thousands of 1979 dollars)									
General government	35	36	36	37	38	38	39	40	41
Public safety	77	78	79	80	82	84	85	87	89
Public works	165	169	172	175	180	183	186	191	196
Health and welfare	6	6	6	6	6	6	6	7	7
Recreation and culture	11	11	11	11	11	12	12	12	12
Debt service	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>28</u>	<u>29</u>
TOTAL	314	320	326	332	342	348	354	364	375

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

Table 3-29. Impact of the WIPP on Municipal Finances: Loving^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Own source									
Taxes	(b)	1	1	1	(b)	(b)	1	1	1
Charges and miscellaneous	3	8	13	9	4	5	5	6	6
Intergovernmental transfers									
State	1	2	3	2	1	1	1	1	1
Federal	(b)	1	1	1	(b)	(b)	(b)	1	1
Local	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>
TOTAL	5	12	19	14	7	7	8	9	9
EXPENDITURES (thousands of 1979 dollars)									
General government	1	1	2	2	1	1	1	1	1
Public safety	2	3	4	3	2	2	2	2	2
Public works	3	9	14	10	5	5	6	6	6
Health and welfare	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Recreation and culture	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Debt service	<u>(b)</u>	<u>(b)</u>	<u>(b)</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>
TOTAL	6	14	22	16	9	9	10	12	12

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.^bLess than \$500.

Table 3-30. Baseline County Finances: Eddy County^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Own source									
Taxes	2,380	2,420	2,440	2,460	2,490	2,510	2,540	2,570	2,600
Charges and miscellaneous	1,780	1,820	1,850	1,880	1,910	1,950	2,000	2,040	2,090
Intergovernmental transfers									
State	610	620	630	640	650	660	680	700	710
Federal	870	890	910	920	940	960	980	1,000	1,030
TOTAL	5,640	5,750	5,840	5,900	5,980	6,080	6,190	6,310	6,440
EXPENDITURES (thousands of 1979 dollars)									
General government	1,380	1,410	1,440	1,460	1,480	1,510	1,550	1,590	1,620
Public safety	780	790	810	820	830	850	870	890	910
Public works	1,820	1,860	1,890	1,920	1,950	1,990	2,040	2,090	2,140
Health and welfare	380	390	400	400	410	420	430	440	450
Recreation and culture	100	110	110	110	110	110	120	120	120
TOTAL	4,460	4,570	4,650	4,700	4,780	4,880	5,000	5,120	5,250

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

Table 3-31. Impact of the Wipp on County Finances: Eddy County^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Own source									
Taxes	4	20	40	44	28	18	19	21	22
Charges and miscellaneous	6	20	32	25	13	12	14	15	15
Intergovernmental transfers									
State	4	15	24	19	10	9	11	11	12
Federal	<u>6</u>	<u>20</u>	<u>33</u>	<u>26</u>	<u>13</u>	<u>12</u>	<u>15</u>	<u>16</u>	<u>16</u>
TOTAL	20	74	129	113	64	51	59	64	64
EXPENDITURES (thousands of 1979 dollars)									
General government	10	33	55	43	22	20	25	26	26
Public safety	5	19	31	24	12	12	14	15	15
Public works	12	44	72	57	29	27	33	34	34
Health and welfare	3	9	15	12	6	6	7	7	7
Recreation and culture	<u>1</u>	<u>2</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>
TOTAL	31	108	177	139	72	66	80	84	85

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

projected to be \$4.6 million in 1982-1983 under baseline conditions. The WIPP project should raise spending to \$4.8 million in that fiscal year, for an increase of over \$0.2 million.

Under existing conditions and assumptions used in this analysis, in fiscal year 1982-1983 the WIPP will add \$48,000 more to expenditures than to revenues in Eddy County; in 1988-1989, additions to expenditures will exceed revenues by \$21,000.

3.3.4.2 Scenario II: Hobbs and Lea County

Hobbs

The maximum population impact of WIPP construction will occur in fiscal year 1982-1983. In that year, Hobbs municipal revenues should reach \$12.2 million under baseline conditions, or \$343 per capita (Table 3-32). The WIPP project will raise revenues to \$12.5 million, an increase of \$0.3 million for 1982-1983 (Table 3-33).

In fiscal year 1988-1989, revenues are projected at \$13.9 million under baseline conditions and \$14.0 million with the project, a difference of \$0.1 million.

Hobbs municipal expenditures are projected to be \$10.2 million in 1982-1983 under baseline conditions and \$10.4 million with the WIPP, which would raise spending by approximately \$0.2 million in 1982-1983. In 1988-1989, municipal spending should reach \$11.4 million without the project and \$11.5 million with the WIPP, an increase of \$0.1 million attributable to the WIPP.

The net effect of the WIPP project on the Hobbs municipal budget is projected to be a surplus of revenues over expenditures of \$0.05 million in 1982-1983 and \$0.02 million in 1988-1989.

Lea County

Lea County revenues are projected to reach \$6.7 million in 1982-1983 under baseline conditions and show an additional increase of \$0.05 million with the WIPP. For 1988-1989, baseline revenues should be \$8.4 million, and the WIPP project should increase these revenues by approximately \$0.02 million (Tables 3-34 and 3-35).

Lea County expenditures for 1982-1983 are projected at \$4.8 million under baseline conditions and \$4.9 million with the WIPP, which would raise spending by about \$0.07 million for the year. In 1988-1989, the WIPP is projected to raise spending by \$0.03 million from the \$5.4 million baseline level.

The net fiscal impact of the WIPP on Lea County is projected to be small. For 1982-1983, it will raise spending by \$20,000 more than revenues. In 1988-1989, the net deficit will fall to \$9,000.

Table 3-32. Baseline Municipal Finances: Hobbs^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Own source									
Taxes	1,110	1,140	1,180	1,210	1,250	1,280	1,310	1,330	1,350
Charges and miscellaneous	4,070	4,190	4,310	4,440	4,560	4,680	4,760	4,840	4,890
Intergovernmental transfers									
State	5,190	5,330	5,470	5,610	5,760	5,900	6,010	6,110	6,170
Federal	<u>1,220</u>	<u>1,250</u>	<u>1,280</u>	<u>1,320</u>	<u>1,350</u>	<u>1,380</u>	<u>1,410</u>	<u>1,430</u>	<u>1,440</u>
TOTAL ^b	11,590	11,920	12,240	12,580	12,930	13,240	13,490	13,720	13,860
EXPENDITURES (thousands of 1979 dollars)									
General government	1,810	1,860	1,910	1,960	2,010	2,060	2,100	2,140	2,160
Public safety	2,320	2,380	2,450	2,510	2,580	2,640	2,690	2,740	2,760
Public works	3,580	3,690	3,800	3,920	4,040	4,140	4,220	4,290	4,330
Health and welfare	600	610	630	640	660	680	690	700	710
Recreation and culture	710	730	750	770	790	810	820	840	840
Debt service	<u>670</u>	<u>670</u>	<u>670</u>	<u>670</u>	<u>670</u>	<u>670</u>	<u>670</u>	<u>670</u>	<u>650</u>
TOTAL ^b	9,690	9,950	10,200	10,470	10,750	10,990	11,180	11,360	11,450

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

^bTotal includes approximately \$4000 in transfers not classified as State or Federal.

Table 3-33. Impact of the WIPP on Municipal Finances: Hobbs^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Own source									
Taxes	3	13	23	21	12	9	11	12	12
Charges and miscellaneous	17	60	97	75	38	35	42	44	44
Intergovernmental transfers									
State	20	69	114	90	47	43	51	54	55
Federal	<u>4</u>	<u>15</u>	<u>24</u>	<u>19</u>	<u>10</u>	<u>9</u>	<u>11</u>	<u>12</u>	<u>12</u>
TOTAL	45	157	259	206	108	96	115	122	122
EXPENDITURES (thousands of 1979 dollars)									
General government	7	24	40	32	16	15	18	19	19
Public safety	9	31	51	40	21	19	23	24	24
Public works	16	55	89	69	34	31	37	39	40
Health and welfare	2	8	13	10	5	5	6	6	6
Recreation and culture	<u>3</u>	<u>9</u>	<u>16</u>	<u>12</u>	<u>6</u>	<u>6</u>	<u>7</u>	<u>7</u>	<u>7</u>
TOTAL	37	128	209	163	84	76	91	96	97

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

Table 3-34. Baseline County Finances: Lea County^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Own source									
Taxes	3,260	3,440	3,620	3,810	4,010	4,230	4,450	4,680	4,920
Charges and miscellaneous	1,340	1,380	1,400	1,430	1,460	1,500	1,520	1,550	1,570
Intergovernmental transfers									
State	560	580	590	600	610	630	640	650	660
Federal	<u>1,070</u>	<u>1,090</u>	<u>1,110</u>	<u>1,140</u>	<u>1,160</u>	<u>1,180</u>	<u>1,210</u>	<u>1,230</u>	<u>1,250</u>
TOTAL	6,240	6,480	6,730	6,980	7,250	7,530	7,820	8,110	8,400
EXPENDITURES (thousands of 1979 dollars)									
General government	1,410	1,440	1,470	1,500	1,530	1,560	1,590	1,620	1,650
Public safety	730	750	760	780	800	810	830	840	860
Public works	2,060	2,110	2,150	2,200	2,240	2,290	2,340	2,380	2,410
Health and welfare	400	410	420	430	440	450	460	460	470
Recreation and culture	10	10	10	10	10	10	10	10	10
Debt service	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL	4,620	4,720	4,820	4,920	5,020	5,130	5,230	5,320	5,400

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

Table 3-35. Impact of the WIPP on County Finances: Lea County^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Own source									
Taxes	2	7	14	15	10	6	6	7	7
Charges and miscellaneous	3	9	15	12	6	6	7	7	7
Intergovernmental transfers									
State	1	5	8	6	3	3	4	4	4
Federal	<u>2</u>	<u>6</u>	<u>10</u>	<u>8</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>5</u>	<u>5</u>
TOTAL	7	27	47	41	23	19	21	23	23
EXPENDITURES (thousands of 1979 dollars)									
General government	4	12	21	16	8	8	9	10	10
Public safety	2	6	11	8	4	4	5	5	5
Public works	5	18	30	24	12	11	14	14	14
Health and welfare	1	4	6	5	2	2	3	3	3
Recreation and culture	<u>(b)</u>	<u>(b)</u>	<u>(b)</u>	<u>(b)</u>	<u>(b)</u>	<u>(b)</u>	<u>(b)</u>	<u>(b)</u>	<u>(b)</u>
TOTAL	12	41	68	54	28	25	30	32	32

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.^bLess than \$500.

3.3.4.3 School District Finances

Scenario I: Carlsbad and Loving School Districts

The principal impact of the WIPP repository on Carlsbad school expenditures is expected to be on operation expenses. Major capital outlays should not be required because the school system is projected to have excess capacity, with or without the WIPP, for the foreseeable future. The peak impact on school spending is expected in 1982-1983, when expenditures increase about \$814,000 over baseline levels (Table 3-37).

The WIPP is expected to increase district revenues more than spending. In the peak-impact year of 1982-1983, revenues are projected to be \$848,000 higher with the WIPP than without, largely because of increases in district property tax revenues.

The Loving school district will experience an increase in revenues of \$34,000 in 1982-1983 as a result of the WIPP (Table 3-39). WIPP-related expenditures for the year are projected to be \$39,000. In the long run, WIPP-related expenditures will exceed revenues by approximately \$6000 per year.

Scenario II: Hobbs School District

Hobbs will probably require a new school in the rapidly growing northern part of the city in the late 1980s; this school will be required with or without the WIPP. At current construction costs, a new 20-room school will add about \$150,000 in debt service* to the annual debt service indicated in Table 3-40. The share of this debt service attributable to the WIPP (3 of the 20 classrooms) is approximately \$23,000 per year.

The greatest WIPP-related increase in operating expenses (\$288,000) will occur in 1982-1983 (Table 3-41). District revenues are projected to increase by more than spending as a result of the WIPP during the mid-1980s. In 1982-1983, revenues will be \$297,000 more with the WIPP than without it. In the long run, the debt service associated with the probable new school will cause WIPP-related expenditures to exceed revenues by about \$18,000 per year.

3.3.5 Socioeconomic Effects Under Changed Circumstances

If the basic conditions assumed in this analysis change, the predicted impacts will change. If the project is delayed, apparent costs will rise because of inflation. If economic activities in Eddy and Lea Counties are appreciably different, then the degree of migration or employment of local individuals may change significantly. In general, if the economic conditions are not as bright as forecast, the impacts of the WIPP repository will not be as great because more construction workers will be available from the local area. Conversely, if the economic conditions are such that there is a shortage of construction workers beyond that forecast, then a heavier degree of migration to local communities will be necessary in order to meet WIPP employment requirements.

*Based on an assumed construction cost of \$1.5 million financed through 20-year, 8% bonds.

Table 3-36. Baseline Finances: Carlshad School District^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Operational fund	10,090	10,210	10,160	10,370	10,470	10,750	11,060	11,420	11,850
Other funds	<u>3,960</u>	<u>4,040</u>	<u>4,070</u>	<u>4,160</u>	<u>4,220</u>	<u>4,320</u>	<u>4,440</u>	<u>4,570</u>	<u>4,720</u>
TOTAL	14,060	14,250	14,230	14,530	14,690	15,070	15,500	15,990	16,580
EXPENDITURES (thousands of 1979 dollars)									
Operational fund	10,660	10,780	10,720	10,950	11,060	11,350	11,680	12,050	12,520
Other funds	<u>2,660</u>	<u>2,690</u>	<u>2,670</u>	<u>2,730</u>	<u>2,760</u>	<u>2,830</u>	<u>2,910</u>	<u>3,010</u>	<u>3,120</u>
Debt service	<u>280</u>	<u>280</u>	<u>280</u>	<u>280</u>	<u>280</u>	<u>280</u>	<u>280</u>	<u>280</u>	<u>280</u>
TOTAL	13,590	13,740	13,670	13,950	14,090	14,450	14,870	15,340	15,910

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

Table 3-37. Impact of the WIPP on Finances: Carlsbad School District^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Operational fund	109	372	617	493	262	240	290	305	309
Other funds	<u>36</u>	<u>131</u>	<u>231</u>	<u>206</u>	<u>119</u>	<u>94</u>	<u>109</u>	<u>117</u>	<u>119</u>
TOTAL	145	504	848	699	381	335	398	422	428
EXPENDITURES (thousands of 1979 dollars)									
Operational fund	115	393	652	521	276	254	306	322	327
Other funds	<u>29</u>	<u>98</u>	<u>162</u>	<u>130</u>	<u>69</u>	<u>63</u>	<u>76</u>	<u>80</u>	<u>81</u>
TOTAL	143	491	814	650	345	317	382	402	408

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

Table 3-38. Baseline Finances: Loving School District ^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Operational fund	600	600	610	620	640	640	650	670	680
Other funds	<u>210</u>	<u>220</u>	<u>220</u>	<u>220</u>	<u>230</u>	<u>230</u>	<u>240</u>	<u>240</u>	<u>250</u>
TOTAL	810	820	830	840	860	880	890	910	930
EXPENDITURES (thousands of 1979 dollars)									
Operational fund	670	680	690	700	720	730	740	760	780
Other funds	170	170	180	180	180	180	190	190	200
Debt service	<u>10</u>	<u>10</u>	<u>20</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>70</u>
TOTAL	850	870	890	900	930	950	980	1,010	1,040

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

Table 3-39. Impact of the WIPP on Finances: Loving School District^a

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Operational fund	3	17	27	24	12	10	14	17	17
Other funds	<u>1</u>	<u>4</u>	<u>7</u>	<u>6</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>4</u>
TOTAL	4	21	34	30	15	13	17	21	21
EXPENDITURES (thousands of 1979 dollars)									
Operational fund	4	19	31	27	13	11	15	19	19
Other funds	<u>1</u>	<u>5</u>	<u>8</u>	<u>7</u>	<u>3</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>5</u>
Debt service	<u>(b)</u>	<u>(b)</u>	<u>(b)</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>3</u>
TOTAL	5	24	39	34	18	16	21	27	27

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

^bLess than \$500.

Table 3-40. Baseline Finances: Hobbs School District^{a,b}

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Operational fund	11,220	11,230	11,270	11,310	11,480	11,690	11,830	11,950	12,040
Other funds	<u>2,030</u>	<u>2,040</u>	<u>2,060</u>	<u>2,090</u>	<u>2,130</u>	<u>2,170</u>	<u>2,200</u>	<u>2,230</u>	<u>2,250</u>
TOTAL	13,250	13,280	13,330	13,400	13,610	13,870	14,030	14,180	14,300
EXPENDITURES (thousands of 1979 dollars)									
Operational fund	11,210	11,230	11,260	11,300	11,480	11,690	11,820	11,940	12,030
Other funds	1,590	1,600	1,600	1,610	1,630	1,660	1,680	1,700	1,710
Debt service	<u>590</u>	<u>610</u>	<u>620</u>	<u>640</u>	<u>660</u>	<u>680</u>	<u>700</u>	<u>710</u>	<u>730</u>
TOTAL	13,400	13,430	13,480	13,550	13,720	14,020	14,200	14,350	14,480

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

^bThe effect of possible new school buildings is not included.

Table 3-41. Impact of the WIPP on Finances: Hobbs School District^{a,b}

Revenue source or expenditure	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
REVENUES (thousands of 1979 dollars)									
Operational fund	42	150	252	203	108	98	119	124	124
Other funds	<u>7</u>	<u>26</u>	<u>45</u>	<u>39</u>	<u>22</u>	<u>18</u>	<u>21</u>	<u>23</u>	<u>23</u>
TOTAL	49	176	297	242	131	117	140	147	147
EXPENDITURES (thousands of 1979 dollars)									
Operational fund	42	150	252	202	108	98	119	124	124
Other funds	<u>6</u>	<u>21</u>	<u>36</u>	<u>29</u>	<u>15</u>	<u>14</u>	<u>17</u>	<u>18</u>	<u>18</u>
TOTAL	48	172	288	231	124	112	136	142	142

^aData computed by Larry Adcock and Associates. Detail may not equal total because of rounding.

^bThe effect of possible new school buildings is not included.

LIST OF REFERENCES

- Adcock, Larry and Associates, 1979. Demographic analysis utilizing data obtained from various sources.
- Bennett, M.D., 1977. "Medically Underserved Areas of New Mexico," Working Paper, School of Medicine, University of New Mexico.
- ESCNM (Employment Security Commission of New Mexico), 1975-1978. Research and Statistics Division, various published and unpublished data.
- NMISC (New Mexico Interstate Stream Commission), 1975. County Profile for Eddy County and County Profile for Lea County.
- OWRC (Old West Regional Commission), 1975. Construction Worker Profile.
- Rand-McNally Corporation, 1979. Commercial Atlas and Marketing Guide.
- USDC (U.S. Department of Commerce), 1970. Census of Housing.
- USDC (U.S. Department of Commerce), 1977. Survey of Business.

Appendix A

AN OUTLINE OF THE INPUT-OUTPUT MODEL AND THE IMPACT PROJECTIONS METHODOLOGY

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
LIST OF TABLES	A-iv
A.1 Input-Output Model	A-1
A.1.1 Base Model	A-1
A.1.2 Household Compensation for Labor and Personal Consumption in the Area.	A-2
A.2 Output Multiplier.	A-3
A.3 Employment Multipliers	A-3
A.3.1 Wages.	A-18
A.3.2 Calculating Indirect Job Impact.	A-18
A.4 Population	A-22
A.4.1 Population Impact Calculations	A-34
A.5 Personal Income.	A-44
A.5.1 General.	A-44
A.5.2 Explanation and Values	A-44
A.6 Housing and Land Use	A-48
A.6.1 Community Services and Facilities.	A-50
A.7 Fiscal Impact Analysis	A-52
A.7.1 Revenues	A-53
A.7.2 Expenditures	A-56
A.7.3 Net Fiscal Impacts	A-57
Bibliography	A-58
Annex Reprint of "A Non-Survey Technique for Constructing a Direct Requirements Regional Input-Output Table"	A-61

LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
A-1	Input/Output Tables, Lea and Eddy Counties, November 1979, Direct Coefficients.	A-4
A-2	Input/Output Tables, Lea and Eddy Counties, November 1979, Direct, Indirect and Induced Coefficients.	A-11
A-3	Estimated Annual Wages and Labor Costs Per Employee by Sub- sector: Eddy and Lea Counties (1979).	A-19
A-4	Indirect Impact -- Dollar Volume and Jobs Supported -- by Subsector (1980)	A-23
A-5	Indirect Impact -- Dollar Volume and Jobs Supported -- by Subsector (1981)	A-24
A-6	Indirect Impact -- Dollar Volume and Jobs Supported -- by Subsector (1982)	A-25
A-7	Indirect Impact -- Dollar Volume and Jobs Supported -- by Subsector (1983)	A-26
A-8	Indirect Impact -- Dollar Volume and Jobs Supported -- by Subsector (1984)	A-27
A-9	Indirect Impact -- Dollar Volume and Jobs Supported -- by Subsector (1985 and 1986).	A-28
A-10	Indirect Impact -- Dollar Volume and Jobs Supported -- by Subsector (Average Year, 1987 and Thereafter).	A-29
A-11	Indirect Impact -- Dollar Volume and Jobs Supported -- by Major Sector (1980-1987 and Thereafter).	A-30
A-12	Jobs Created and/or Supported by the Construction and Operation of the WIPP (1980 Through 1987 and Thereafter)	A-32
A-13	Baseline Population Estimates and Projections (Without WIPP) . .	A-43
A-14	Eddy County, Personal Income by Major Sources 1972-1977.	A-45
A-15	Lea County, Personal Income by Major Sources, 1972-1977.	A-46
A-16	Personal Income Due to WIPP.	A-47
A-17	Housing Demand	A-50
A-18	Revenue Categories and Projection Methods Used for New Mexico Municipalities and Counties	A-54

A.1 INPUT-OUTPUT MODEL

A static model in the form of a regional input-output model was constructed for Eddy and Lea Counties, New Mexico. The original derivation of the input-output model is described in the Proceedings of the 1975 Conference of the Association of University Business and Economic Research. That paper is attached to this appendix as an annex. The procedure described in that document was, in general, followed in building the regional input-output model.

Since the publication of that document, information on the agricultural sector in New Mexico has been improved, and the credibility of the agricultural information is believed to be such that the variation experienced in the original model has been decreased. Regardless of the extent of the accuracy of the agricultural information, the effect of the construction and operation of the WIPP on the agricultural sector is believed to be less than 1% in terms of employment and income. Therefore, the accuracy of the agricultural sector in terms of indirect consequences is negligible in the overall modeling process.

This model has been used to assess the economic impacts of the following activities for the following agencies: San Juan generating units 1, 3, and 4 for the Public Service Company of New Mexico; Social and Economic Assessment Study, Gallup-Navajo Indian Water Supply Project for the Bureau of Reclamation; analysis of multipliers for a proposed nuclear power plant at Cementon, New York, for Harbridge House, Inc., an agency of the Power Authority of the state of New York; analysis of two sites for nuclear or fossil fuel electric generating units for Harbridge House, Inc., an agent of the New York State Electric & Gas Corporation; analysis of four coal development scenarios in northwest New Mexico for Harbridge House, Inc., an agent of the Bureau of Land Management; socioeconomic analysis of the proposed New Mexico generating station for the Public Service Company of New Mexico; and general economic impacts (an ongoing process) for the Bureau of Business and Economic Research, University of New Mexico.

During or about the same time this study was being conducted, the model was used for analysis of the economic impacts of a proposed coal-fired generating unit for Burns and McDonnell, an agent of Plains Electric Cooperative; an analysis of industrial linkages in Cecil County, Maryland, for Harbridge House, Inc., an agent of the Cecil County Development Agency; and an analysis of economic impact of decreased grazing allocations in the Roswell, New Mexico Grazing District for Harbridge House, Inc., an agent of the Bureau of Land Management. Thus, the model has been used extensively and is accepted as a tool to determine the economic impact of proposed new facilities and developments.

A.1.1 Base Model

The regional model adjusts a national model by means of location quotients and aggregating techniques. The national model, or base model, used in this process contains 407 economic categories or subsectors of the economy, 389 of which represent the private economy and 18 of which represent other activities

including the public sector. The 389 private subsectors were used in the model; the government impact was computed using four of the public subsectors supplemented by a final demand pattern from the business service subsector.

The national base model is an updated version of the 1967 National Input-Output Model constructed by the Department of Commerce, Bureau of Economic Analysis. Two important changes in the 1967 version have been made. First, the mining sectors have been expanded to 44 subsectors in the latest version. Second, the Lawrence Berkeley Laboratory has mathematically updated the 1967 version to a 1972 version using a process called RAS. In simple terms, the RAS process updates the technical coefficients using 1972 data collected through the Bureau of the Census in the 1972 Census of Business.

As previously noted, discussion of the detailed modeling process and technical procedures can be found in the annex to this appendix. However, several important aspects of this particular model for Eddy and Lea Counties should be noted. First, detailed information on employment, by category, was determined from information supplied by the New Mexico Employment Security Department (NMESD) (formerly the Employment Security Commission). Using this information, detailed location quotients for manufacturing were determined at the four-digit "SIC" Code level; this added credibility and accuracy to the modeling process.

Second, because of the makeup of retail and wholesale subsectors within Eddy and Lea Counties, a detailed analysis of the types of outlets located within the area was conducted. Basic information from the 1972 Census of Business was used with updated information from the employment files for this analysis.

Finally, once the location quotients had been determined, 1972 Census data and various other state and local data sources were used to identify output per employee for those subsectors with location quotients computed through employment statistics. A total output figure was derived for these subsectors. In turn, the total output figures were used to aggregate the 389 subsectors in the base model into 37 private business subsectors and one governmental subsector for the regional model.

Subsectors for WIPP aboveground construction (1980, 1981, 1982, 1983, and 1984), WIPP management and design employment, WIPP belowground construction (1980, 1981, 1982, 1983, and 1984), WIPP operation--aboveground, WIPP operation--remote handling and security, and WIPP operation--belowground were derived from data supplied by Sandia Laboratories; Bechtel, Incorporated; and Westinghouse Electric Corporation. Thus, there are a total of 52 subsectors in the model for Eddy and Lea Counties and two additional subsectors to account for labor compensation.

A.1.2 Household Compensation for Labor and Personal Consumption in the Area

The figures for labor percentages, or coefficients, were determined through material produced in the 1972 National Input-Output Model. These figures represent the average percentage of cost going to labor from the technical production process (direct coefficients). Personal consumption

figures were adjusted by weighting the location quotients of each of the 37 identified private business and one governmental subsectors in the regional model. An additional personal consumption column adjusted for reduced local purchases was incorporated in the model to allow for lower local consumption by construction workers that commute on a weekly basis. The labor coefficients for the 14 WIPP subsectors were derived from data supplied by Sandia, Bechtel, and Westinghouse. The allocation of the labor coefficients of the five WIPP aboveground construction subsectors and the five WIPP belowground construction subsectors between construction workers that commute and those that reside in the two-county area was made using the comparable factors from the Construction Worker Profile.

The final results of the determination of the location quotients and the aggregation process can be found on Table A-1, which lists the direct coefficients. The results of the matrix inversion, or the aggregated direct, indirect, and induced effects of the modeling effort follow in Table A-2.

A.2 OUTPUT MULTIPLIER

The volume of activity generated in the private sector due to a \$1 exogenous increase in a subsector can be determined through the input-output process. For example, considering WIPP aboveground construction (1982), subsector 40, we find the column sum of 1.67062 in Table A-2. Thus, \$1.67 in total activity will be experienced in the region due to \$1 exogenous increase in WIPP aboveground construction (1982) activity. That is an additional \$0.67 of indirect activity, including payments to labor, will be generated in Eddy and Lea Counties.

It should be noted at this point that the output multiplier is not of primary concern in determining overall impact of new developments within the area. The employment and income multipliers are believed to be of greater importance. These multipliers may vary significantly from the 1.67 multiplicative multiplier noted for total dollar output change due to an increase in activity in the aboveground construction (1982) subsector of the two-county economy.

A.3 EMPLOYMENT MULTIPLIERS

In order to determine the employment multipliers for the WIPP related development, three basic steps (procedures) must be undertaken. First, wage information for the area or region under consideration must be determined in constant dollars--in this case 1979 dollars. Second, the change in total output on an annual basis for an exemplary year using constant 1979 dollars must be determined. Finally, computations to determine the actual number of dollars from the technical process going for labor costs must be derived.

Table A-1
HIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979
DIRECT COEFFICIENTS
INDUSTRY PURCHASING

		1	2	3	4	5	6	7	8		
I N D U S T R Y S E L I N G	LIVESTK & LIVESTK PROD	1	0.30891	0.02889	0.09777	0.01457	0.14889	0.00151	0.00000	0.00000	1
	COTTON	2	0.00000	0.01636	0.00000	0.00000	0.00000	0.00095	0.00000	0.00000	2
	GRAINS AND SEEDS	3	0.26662	0.00000	0.02988	0.00000	0.00000	0.00772	0.00000	0.00000	3
	FRUITS AND VEGETABLES	4	0.00049	0.00000	0.00000	0.00378	0.00000	0.00090	0.00000	0.00000	4
	FORESTRY&FISHERY PRODS	5	0.00000	0.00000	0.00000	0.00000	0.07158	0.00000	0.00000	0.00000	5
	AGRICULTURAL SERVICES	6	0.00263	0.10165	0.01289	0.05881	0.02604	0.00000	0.00000	0.00000	6
	MISC MET & NON-MET MIN	7	0.00000	0.00009	0.00020	0.00008	0.00000	0.00000	0.00836	0.00000	7
	CRUDE PETROLEUM	8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00250	8
	NATURAL GAS & LIQ. PET	9	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	9
	STONE, GRAVEL AND SAND	10	0.00001	0.00137	0.00184	0.00094	0.00000	0.00000	0.00000	0.00000	10
	POTASH MINING	11	0.00000	0.00071	0.00120	0.00056	0.00000	0.00000	0.00000	0.00000	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.00387	0.01065	0.00935	0.00702	0.00000	0.00000	0.00222	0.02719	15
	FOOD PRODUCTS	16	0.02322	0.00000	0.00000	0.00000	0.01580	0.00003	0.00000	0.00000	16
	FABRICS AND APPAREL	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
	WOOD & LUMBER PROD.	18	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	18
	PRINTING	19	0.00001	0.00003	0.00002	0.00002	0.00000	0.00000	0.00000	0.00000	19
	CHEMICAL PRODUCTS	20	0.00079	0.00507	0.00659	0.00247	0.00056	0.00000	0.02144	0.00319	20
	PLASTIC & PETROLEUM	21	0.00328	0.03672	0.03285	0.01250	0.03032	0.00012	0.00205	0.00426	21
	GLASS AND STONE PRODS.	22	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	22
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	0.00008	24
	MACHINERY	25	0.00008	0.00024	0.00011	0.00010	0.00000	0.00000	0.01063	0.00008	25
	ELECTRICAL PRODS.	26	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	26
	TRANSPRTN & WRHSNG	27	0.01356	0.01047	0.01312	0.00868	0.00522	0.00065	0.00584	0.00139	27
	COMMUNICATIONS	28	0.00146	0.00286	0.00184	0.00133	0.00000	0.00000	0.00282	0.00078	28
	ELECTRICAL UTILITY	29	0.00186	0.00738	0.00161	0.00281	0.00021	0.00003	0.01118	0.01071	29
	GAS UTILITY	30	0.00002	0.00000	0.00000	0.00000	0.00028	0.00003	0.00239	0.00159	30
	WATER AND SEWER	31	0.00018	0.00832	0.00720	0.00770	0.00000	0.00000	0.00000	0.00050	31
	WHOLESALE TRADE	32	0.01542	0.03706	0.02949	0.02561	0.02824	0.00047	0.00558	0.00409	32
	RETAIL TRADE	33	0.01004	0.02745	0.02302	0.01103	0.00893	0.00023	0.00119	0.00382	33
	F. I. & R.E	34	0.00868	0.07375	0.04181	0.02078	0.01685	0.00107	0.00815	0.00158	34
	LODG, PERS.& REP SER	35	0.00330	0.00862	0.00442	0.00377	0.00575	0.00002	0.00051	0.00216	35
	BUSINESS & MISC. SERV.	36	0.00139	0.02915	0.02602	0.01550	0.00005	0.00000	0.00816	0.01375	36
	MEDICAL & NON-PROFIT	37	0.00051	0.00056	0.00035	0.00040	0.00000	0.00000	0.00121	0.00028	37
	HIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	HIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	HIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	HIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	HIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	HIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	HIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	HIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	HIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	HIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	HIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	HIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	HIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	HIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.00007	0.00014	0.00010	0.00012	0.00032	0.00000	0.00154	0.00037	52
	HOUSEHOLDS/PC WEEKLY	53	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	53
	HOUSEHOLDS/PC LOCAL	54	0.04276	0.07285	0.07285	0.07285	0.20020	0.35031	0.32507	0.11930	54
*** COLUMN SUMS ***			0.70916	0.48049	0.41450	0.27144	0.55967	0.36404	0.42633	0.28762	

Table A-1 (cont'd.)
WIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979
DIRECT COEFFICIENTS
INDUSTRY PURCHASING

		9	10	11	12	13	14	15	16		
A-5 I N D U S T R Y S E L I N G	LIVESTK & LIVESTK PROD	1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.07348	1	
	COTTON	2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.10494	2	
	GRAINS AND SEEDS	3	0.00000	0.00000	0.00000	0.00031	0.00013	0.00018	0.02323	3	
	FRUITS AND VEGETABLES	4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00155	4	
	FORESTRY&FISHERY PRODS	5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5	
	AGRICULTURAL SERVICES	6	0.00000	0.00000	0.00000	0.00139	0.00077	0.00285	0.00047	6	
	MISC MET & NON-MET MIN	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00005	7	
	CRUDE PETROLEUM	8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	8	
	NATURAL GAS & LIQ. PET	9	0.14584	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	9	
	STONE, GRAVEL AND SAND	10	0.00000	0.00446	0.00000	0.00201	0.00271	0.02103	0.00657	0.00012	10
	POTASH MINING	11	0.00000	0.00048	0.01395	0.00000	0.00000	0.00000	0.00000	0.00000	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.03218	0.00796	0.00205	0.00025	0.00036	0.00034	0.00015	0.00244	15
	FOOD PRODUCTS	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.02480	16
	FABRICS AND APPAREL	17	0.00000	0.00000	0.00000	0.00098	0.00003	0.00061	0.00010	0.00019	17
	WOOD & LUMBER PROD.	18	0.00000	0.00000	0.00000	0.03789	0.01187	0.00210	0.00382	0.00000	18
	PRINTING	19	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00131	19
	CHEMICAL PRODUCTS	20	0.00803	0.00646	0.01969	0.00049	0.00191	0.00263	0.00032	0.00106	20
	PLASTIC & PETROLEUM	21	0.00441	0.01289	0.00574	0.00601	0.00944	0.02759	0.00749	0.00317	21
	GLASS AND STONE PRODS.	22	0.00000	0.05511	0.00000	0.02664	0.03524	0.02147	0.00287	0.00000	22
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00003	0.00000	0.00000	0.00196	0.00309	0.00187	0.00047	0.00000	24
	MACHINERY	25	0.00011	0.00509	0.01535	0.00038	0.00058	0.00051	0.00024	0.00000	25
	ELECTRICAL PRODS.	26	0.00000	0.00000	0.00000	0.00020	0.00029	0.00023	0.00007	0.00000	26
	TRNSPRTTN & WRHSING	27	0.00167	0.01329	0.00977	0.02637	0.02787	0.04716	0.02166	0.02313	27
	COMMUNICATIONS	28	0.00093	0.00020	0.00259	0.00316	0.00471	0.00431	0.00211	0.00465	28
	ELECTRICAL UTILITY	29	0.00574	0.02649	0.02001	0.00055	0.00084	0.00077	0.00037	0.00600	29
	GAS UTILITY	30	0.01419	0.00291	0.02469	0.00012	0.00017	0.00015	0.00007	0.00187	30
	WATER AND SEWER	31	0.00105	0.00281	0.00000	0.00029	0.00044	0.00036	0.00017	0.00040	31
	WHOLESALE TRADE	32	0.00923	0.03455	0.00250	0.05106	0.04953	0.04327	0.03911	0.02976	32
	RETAIL TRADE	33	0.00448	0.01193	0.00138	0.08578	0.04874	0.03914	0.06360	0.00185	33
	F. I. & R.E	34	0.10845	0.03037	0.00694	0.00697	0.01026	0.00946	0.00484	0.00709	34
	LODG, PERS.& REP SER	35	0.00255	0.01085	0.00064	0.00488	0.00730	0.00801	0.00354	0.00341	35
	BUSINESS & MISC. SERV.	36	0.01627	0.03144	0.00860	0.05413	0.07157	0.04270	0.01953	0.00810	36
	MEDICAL & NON-PROFIT	37	0.00033	0.00009	0.00119	0.00078	0.00115	0.00106	0.00052	0.00060	37
	WIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	WIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	WIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	WIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	WIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	WIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	WIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	WIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	WIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	WIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	WIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	WIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	WIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	WIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.00043	0.00022	0.00115	0.00046	0.00068	0.00070	0.00031	0.00092	52
	HOUSEHOLDS/PC WEEKLY	53	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	53
	HOUSEHOLDS/PC LOCAL	54	0.11930	0.32507	0.27808	0.32535	0.32535	0.32535	0.49419	0.14492	54
	*** COLUMN SUMS ***		0.47521	0.58268	0.41431	0.63840	0.61502	0.60383	0.67271	0.46901	

Table A-1 (cont'd.)
WIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979

		DIRECT COEFFICIENTS INDUSTRY PURCHASING								
		17	18	19	20	21	22	23	24	
A-6 INDUSTRY SECTOR	LIVESTK & LIVESTK PROD	1	0.00568	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1
	COTTON	2	0.03292	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2
	GRAINS AND SEEDS	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3
	FRUITS AND VEGETABLES	4	0.00000	0.00000	0.00000	0.00114	0.00000	0.00000	0.00000	4
	FORESTRY&FISHERY PRODS	5	0.01529	0.00000	0.00000	0.00374	0.00000	0.00000	0.00000	5
	AGRICULTURAL SERVICES	6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	6
	MISC MET & NON-MET MIN	7	0.00000	0.00000	0.00000	0.00124	0.00004	0.00000	0.00000	7
	CRUDE PETROLEUM	8	0.00000	0.00000	0.00000	0.00000	0.45740	0.00000	0.00000	8
	NATURAL GAS & LIQ. PET	9	0.00000	0.00000	0.00000	0.00231	0.02337	0.00000	0.00000	9
	STONE, GRAVEL AND SAND	10	0.00000	0.00000	0.00000	0.00038	0.00000	0.06606	0.00000	10
	POTASH MINING	11	0.00000	0.00000	0.00000	0.00755	0.00000	0.00000	0.00000	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.00131	0.00294	0.00311	0.00431	0.01019	0.00289	0.00000	15
	FOOD PRODUCTS	16	0.00001	0.00000	0.00000	0.00088	0.00000	0.00000	0.00000	16
	FABRICS AND APPAREL	17	0.10091	0.00080	0.00143	0.00021	0.00007	0.00047	0.00000	17
	WOOD & LUMBER PROD.	18	0.00000	0.00791	0.00000	0.00000	0.00000	0.00000	0.00000	18
	PRINTING	19	0.00001	0.00004	0.01586	0.00004	0.00000	0.00008	0.00000	19
	CHEMICAL PRODUCTS	20	0.00080	0.00274	0.01263	0.05002	0.00578	0.00123	0.00000	20
	PLASTIC & PETROLEUM	21	0.00093	0.00272	0.00236	0.05459	0.05487	0.00919	0.00000	21
	GLASS AND STONE PRODS.	22	0.00000	0.00034	0.00000	0.00000	0.00001	0.02440	0.00000	22
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00000	0.00000	0.00000	0.00005	0.00001	0.00000	0.00000	24
	MACHINERY	25	0.00000	0.00191	0.00000	0.00002	0.00001	0.00308	0.00000	25
	ELECTRICAL PRODS.	26	0.00000	0.00001	0.00002	0.00002	0.00000	0.00000	0.00000	26
	TRANSPRTN & WRHSNG	27	0.00945	0.02748	0.01179	0.02047	0.02876	0.12118	0.00000	27
	COMMUNICATIONS	28	0.00319	0.00406	0.01098	0.00326	0.00067	0.00573	0.00000	28
	ELECTRICAL UTILITY	29	0.00687	0.00674	0.00499	0.01371	0.00569	0.00845	0.00000	29
	GAS UTILITY	30	0.00048	0.00134	0.00096	0.01014	0.01029	0.00399	0.00000	30
	WATER AND SEWER	31	0.00049	0.00000	0.00062	0.00235	0.00188	0.00008	0.00000	31
	WHOLESALE TRADE	32	0.02700	0.04642	0.01965	0.01909	0.00657	0.02680	0.00000	32
	RETAIL TRADE	33	0.00261	0.00177	0.00510	0.00247	0.00045	0.00175	0.00000	33
	F. I. & R.E	34	0.01053	0.01530	0.01723	0.01438	0.01657	0.01788	0.00000	34
	LODG. PERS. & REP SER	35	0.00102	0.00163	0.00339	0.00129	0.00048	0.00418	0.00000	35
	BUSINESS & MISC. SERV.	36	0.00681	0.00877	0.02700	0.01384	0.00968	0.01648	0.00000	36
	MEDICAL & NON-PROFIT	37	0.00043	0.00049	0.00156	0.00056	0.00015	0.00078	0.00000	37
	WIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	WIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	WIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	WIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	WIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	WIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	WIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	WIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	WIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	WIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	WIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	WIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	WIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	WIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.00180	0.00103	0.00664	0.00076	0.00050	0.00080	0.00000	52
	HOUSEHOLDS/PC WEEKLY	53	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	53
	HOUSEHOLDS/PC LOCAL	54	0.29852	0.28617	0.23671	0.38320	0.10374	0.31907	0.31473	54
*** COLUMN SUMS ***			0.52704	0.42061	0.38203	0.61209	0.73718	0.63258	0.31473	0.42805

Table A-1 (cont'd.)
WIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979
DIRECT COEFFICIENTS
INDUSTRY PURCHASING

		25	26	27	28	29	30	31	32	
	LIVESTK & LIVESTK PROD	1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1
	COTTON	2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2
	GRAINS AND SEEDS	3	0.00000	0.00000	0.00133	0.00000	0.00000	0.00000	0.00000	3
	FRUITS AND VEGETABLES	4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4
	FORESTRY&FISHERY PRODS	5	0.00000	0.00000	0.00002	0.00000	0.00000	0.00000	0.00000	5
	AGRICULTURAL SERVICES	6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00117	6
	MISC MET & NON-MET MIN	7	0.00000	0.00000	0.00004	0.00000	0.00000	0.00000	0.00000	7
	CRUDE PETROLEUM	8	0.00000	0.00000	0.00065	0.00000	0.00059	0.02381	0.00000	8
	NATURAL GAS & LIQ. PET	9	0.00000	0.00000	0.00405	0.00000	0.00361	0.14625	0.00000	9
	STONE, GRAVEL AND SAND	10	0.00001	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	10
	POTASH MINING	11	0.00000	0.00000	0.00000	0.00000	0.00001	0.00000	0.00000	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.00168	0.00245	0.02048	0.01411	0.02801	0.01443	0.06484	15
	FOOD PRODUCTS	16	0.00000	0.00000	0.00005	0.00000	0.00000	0.00000	0.00327	16
	FABRICS AND APPAREL	17	0.00070	0.00088	0.00036	0.00012	0.00022	0.00009	0.00031	17
I	WOOD & LUMBER PROD.	18	0.03302	0.00000	0.00000	0.00000	0.00000	0.00000	0.00035	18
N	PRINTING	19	0.00000	0.00235	0.00037	0.00016	0.00001	0.00000	0.00001	19
U	CHEMICAL PRODUCTS	20	0.00029	0.00000	0.00015	0.00001	0.00086	0.00000	0.00154	20
D	PLASTIC & PETROLEUM	21	0.00562	0.00735	0.02989	0.00193	0.01204	0.00076	0.00334	21
S	GLASS AND STONE PRODS.	22	0.00000	0.00002	0.00001	0.00000	0.00000	0.00000	0.00048	22
T	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
R	FABRICATED METAL PRODS	24	0.00002	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	24
Y	MACHINERY	25	0.01938	0.00000	0.00017	0.00000	0.00000	0.00000	0.00044	25
	ELECTRICAL PRODS.	26	0.00081	0.01076	0.00000	0.00000	0.00000	0.00000	0.00006	26
	TRNSPRITN & WRHSING	27	0.01890	0.01110	0.08829	0.00146	0.02086	0.00020	0.00232	27
	COMMUNICATIONS	28	0.00339	0.00726	0.00861	0.01282	0.00250	0.00210	0.00443	28
S	ELECTRICAL UTILITY	29	0.00541	0.00596	0.01622	0.00553	0.07355	0.00260	0.02800	29
E	GAS UTILITY	30	0.00134	0.00193	0.00338	0.00110	0.03353	0.36157	0.01650	30
L	WATER AND SEWER	31	0.00047	0.00013	0.00114	0.00125	0.00097	0.00065	0.00091	31
	WHOLESALE TRADE	32	0.04501	0.02005	0.02379	0.00304	0.00623	0.00063	0.00463	32
I	RETAIL TRADE	33	0.00664	0.00762	0.01069	0.00492	0.00168	0.00156	0.00329	33
N	F. I. & R.E	34	0.01276	0.01924	0.01853	0.01229	0.00464	0.00549	0.01416	34
G	LODG, PERS,& REP SER	35	0.00082	0.00193	0.02424	0.06180	0.00203	0.00034	0.00783	35
	BUSINESS & MISC. SERV.	36	0.00679	0.01306	0.00894	0.00983	0.00417	0.00455	0.00751	36
	MEDICAL & NON-PROFIT	37	0.00045	0.00127	0.00052	0.00059	0.00027	0.00025	0.00051	37
	WIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	WIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	WIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	WIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	WIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	WIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	WIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	WIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	WIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	WIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	WIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	WIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	WIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	WIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.00060	0.00187	0.00308	0.00254	0.00267	0.01382	0.57360	52
	HOUSEHOLDS/PC WEEKLY	53	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	53
	HOUSEHOLDS/PC LOCAL	54	0.36951	0.33341	0.40647	0.39097	0.13980	0.13980	0.13980	54
	*** COLUMN SUMS ***		0.53363	0.44863	0.67151	0.52446	0.33824	0.71889	0.87351	0.57453

Table A-1 (cont'd.)
WIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979

		DIRECT COEFFICIENTS INDUSTRY PURCHASING									
		33	34	35	36	37	38	39	40		
I N D U S T R Y S E L L I N G	LIVESTK & LIVESTK PROD	1	0.00000	0.00034	0.00109	0.00000	0.00003	0.00000	0.00000	0.00000	1
	COTTON	2	0.00000	0.00006	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	2
	GRAINS AND SEEDS	3	0.00000	0.00067	0.00337	0.00000	0.00000	0.00006	0.00006	0.00006	3
	FRUITS AND VEGETABLES	4	0.00000	0.00003	0.00001	0.00000	0.00002	0.00000	0.00000	0.00000	4
	FORESTRY&FISHERY PRODS	5	0.00000	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	5
	AGRICULTURAL SERVICES	6	0.00000	0.00028	0.00020	0.00000	0.00000	0.00032	0.00032	0.00032	6
	MISC MET & NON-MET MIN	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7
	CRUDE PETROLEUM	8	0.00000	0.00006	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	8
	NATURAL GAS & LIQ. PET	9	0.00000	0.00037	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	9
	STONE, GRAVEL AND SAND	10	0.00000	0.00004	0.00001	0.00000	0.00000	0.00744	0.00744	0.00744	10
	POTASH MINING	11	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.00280	0.01757	0.00743	0.00484	0.00900	0.00000	0.00000	0.00000	15
	FOOD PRODUCTS	16	0.00017	0.00012	0.00000	0.00000	0.00032	0.00000	0.00000	0.00000	16
	FABRICS AND APPAREL	17	0.00005	0.00010	0.00148	0.00000	0.00018	0.00000	0.00000	0.00000	17
	WOOD & LUMBER PROD.	18	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	18
	PRINTING	19	0.00049	0.00299	0.00009	0.00051	0.00300	0.00000	0.00000	0.00000	19
	CHEMICAL PRODUCTS	20	0.00005	0.00013	0.00030	0.00090	0.00017	0.00000	0.00000	0.00000	20
	PLASTIC & PETROLEUM	21	0.00540	0.00357	0.00838	0.00430	0.00884	0.00047	0.00047	0.00047	21
	GLASS AND STONE PRODS.	22	0.00001	0.00002	0.00004	0.00001	0.00000	0.00000	0.00000	0.00000	22
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00000	0.00000	0.00000	0.00001	0.00000	0.00136	0.00136	0.00136	24
	MACHINERY	25	0.00005	0.00011	0.00387	0.00238	0.00000	0.00011	0.00011	0.00011	25
	ELECTRICAL PRODS.	26	0.00000	0.00000	0.00009	0.00009	0.00084	0.00000	0.00000	0.00000	26
	TRANSPRTN & WHRSNG	27	0.00172	0.00350	0.00487	0.00803	0.00348	0.00431	0.00431	0.00431	27
	COMMUNICATIONS	28	0.00559	0.01517	0.00644	0.01478	0.01308	0.00439	0.00439	0.00439	28
	ELECTRICAL UTILITY	29	0.01428	0.00966	0.01214	0.00214	0.01781	0.00094	0.00094	0.00094	29
	GAS UTILITY	30	0.00314	0.00194	0.00265	0.00262	0.00352	0.00000	0.00000	0.00000	30
	WATER AND SEWER	31	0.00225	0.00393	0.00340	0.00118	0.00646	0.00000	0.00000	0.00000	31
	WHOLESALE TRADE	32	0.00573	0.00635	0.02391	0.01323	0.02089	0.06613	0.06613	0.06613	32
	RETAIL TRADE	33	0.00383	0.00913	0.01504	0.01652	0.01888	0.00000	0.00000	0.00000	33
	F. I. & R.E	34	0.03464	0.08685	0.03929	0.03435	0.06246	0.00830	0.00830	0.00830	34
	LODG, PERS, & REP SER	35	0.00793	0.00453	0.03926	0.01584	0.02056	0.00211	0.00211	0.00211	35
	BUSINESS & MISC. SERV.	36	0.00795	0.05356	0.01151	0.05497	0.02381	0.00000	0.00000	0.00000	36
	MEDICAL & NON-PROFIT	37	0.00082	0.00689	0.00191	0.00221	0.00340	0.00008	0.00008	0.00008	37
	WIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	WIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	WIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	WIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	WIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	WIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	WIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	WIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	WIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	WIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	WIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	WIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	WIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	WIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.01696	0.02965	0.00350	0.01293	0.01238	0.00000	0.00000	0.00000	52
	HOUSEHOLDS/PC WEEKLY	53	0.00000	0.00000	0.00000	0.00000	0.00000	0.02612	0.01410	0.03087	53
	HOUSEHOLDS/PC LOCAL	54	0.42500	0.36153	0.34761	0.42166	0.51489	0.16734	0.09038	0.19783	54
*** COLUMN SUMS ***			0.53885	0.61897	0.53788	0.61362	0.74405	0.28948	0.20050	0.32472	

Table A-1 (cont'd.)

WIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979

DIRECT COEFFICIENTS
INDUSTRY PURCHASING

		41	42	43	44	45	46	47	48	
A-9 INDUSTRIES S E C T O R	LIVESTK & LIVESTK PROD	1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1
	COTTON	2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2
	GRAINS AND SEEDS	3	0.00006	0.00006	0.00000	0.00000	0.00000	0.00000	0.00000	3
	FRUITS AND VEGETABLES	4	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4
	FORESTRY&FISHERY PRODS	5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5
	AGRICULTURAL SERVICES	6	0.00032	0.00032	0.00000	0.00000	0.00000	0.00000	0.00000	6
	MISC MET & NON-MET MIN	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7
	CRUDE PETROLEUM	8	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	8
	NATURAL GAS & LIQ. PET	9	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	9
	STONE, GRAVEL AND SAND	10	0.00744	0.00744	0.00000	0.00268	0.00268	0.00268	0.00268	10
	POTASH MINING	11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.00000	0.00000	0.00494	0.00000	0.00000	0.00000	0.00000	15
	FOOD PRODUCTS	16	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16
	FABRICS AND APPAREL	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
	WOOD & LUMBER PROD.	18	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	18
	PRINTING	19	0.00000	0.00000	0.00051	0.00000	0.00000	0.00000	0.00000	19
	CHEMICAL PRODUCTS	20	0.00000	0.00000	0.00090	0.00000	0.00000	0.00000	0.00000	20
	PLASTIC & PETROLEUM	21	0.00047	0.00047	0.00430	0.00000	0.00000	0.00000	0.00000	21
	GLASS AND STONE PRODS.	22	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	22
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00136	0.00136	0.00001	0.00051	0.00051	0.00051	0.00051	24
	MACHINERY	25	0.00011	0.00011	0.00238	0.00141	0.00141	0.00141	0.00141	25
	ELECTRICAL PRODS.	26	0.00000	0.00000	0.00009	0.00000	0.00000	0.00000	0.00000	26
	TRNSPRITN & WRHSING	27	0.00431	0.00431	0.00803	0.00401	0.00401	0.00401	0.00401	27
	COMMUNICATIONS	28	0.00439	0.00439	0.01478	0.00067	0.00067	0.00067	0.00067	28
	ELECTRICAL UTILITY	29	0.00094	0.00094	0.00214	0.00882	0.00882	0.00882	0.00882	29
	GAS UTILITY	30	0.00000	0.00000	0.00262	0.00000	0.00000	0.00000	0.00000	30
	WATER AND SEWER	31	0.00000	0.00000	0.00118	0.00000	0.00000	0.00000	0.00000	31
	WHOLESALE TRADE	32	0.06613	0.06613	0.01323	0.07448	0.07448	0.07448	0.07448	32
	RETAIL TRADE	33	0.00000	0.00000	0.01652	0.00000	0.00000	0.00000	0.00000	33
	F. I. & R.E	34	0.00830	0.00830	0.03435	0.00347	0.00347	0.00347	0.00347	34
	LODG, PERS. & REP SER	35	0.00211	0.00211	0.01584	0.00236	0.00236	0.00236	0.00236	35
	BUSINESS & MISC. SERV.	36	0.00000	0.00000	0.05497	0.00000	0.00000	0.00000	0.00000	36
	MEDICAL & NON-PROFIT	37	0.00008	0.00008	0.00221	0.00011	0.00011	0.00011	0.00011	37
	WIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	WIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	WIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	WIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	WIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	WIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	WIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	WIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	WIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	WIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	WIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	WIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	WIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	WIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	52
	HOUSEHOLDS/PC WEEKLY	53	0.04351	0.03817	0.00000	0.04873	0.05452	0.05263	0.04802	53
	HOUSEHOLDS/PC LOCAL	54	0.27879	0.24445	0.53737	0.27294	0.30537	0.26896	0.26896	54
	*** COLUMN SUMS ***		0.41832	0.37864	0.71638	0.42019	0.45841	0.45804	0.44602	

Table A-1 (cont'd.)
WIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979

		DIRECT COEFFICIENTS							
		INDUSTRY PURCHASING							
		45	50	51	52	53	54	***	ROW SUMS ***
INDUSTRY A-10 SECTOR	LIVESTK & LIVESTK PROD	1	0.00000	0.00000	0.00000	0.00000	0.00024	0.00095	1 0.68235
	COTTON	2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2 0.15525
	GRAINS AND SEEDS	3	0.00000	0.00133	0.00000	0.00001	0.00010	0.00041	3 0.33585
	FRUITS AND VEGETABLES	4	0.00000	0.00000	0.00000	0.00000	0.00020	0.00078	4 0.00889
	FORESTRY&FISHERY PRODS	5	0.00000	0.00002	0.00000	0.00000	0.00021	0.00083	5 0.09210
	AGRICULTURAL SERVICES	6	0.00000	0.00000	0.00000	0.00001	0.00007	0.00026	6 0.21110
	MISC MET & NON-MET MIN	7	0.00000	0.00004	0.00000	0.00000	0.00000	0.00000	7 0.01016
	CRUDE PETROLEUM	8	0.00000	0.00065	0.00000	0.00001	0.00000	0.00000	8 0.48568
	NATURAL GAS & LIQ. PET	9	0.00000	0.00405	0.00000	0.00006	0.00000	0.00000	9 0.32986
	STONE, GRAVEL AND SAND	10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001	10 0.15828
	POTASH MINING	11	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	11 0.02447
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12 0.00000
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13 0.00000
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14 0.00000
	CONST. MAINTENANCE	15	0.00494	0.02048	0.00205	0.02145	0.00000	0.00000	15 0.37554
	FOOD PRODUCTS	16	0.00000	0.00005	0.00000	0.00000	0.00417	0.01888	16 0.08958
	FABRICS AND APPAREL	17	0.00000	0.00036	0.00000	0.00004	0.00001	0.00003	17 0.11240
	WOOD & LUMBER PROD.	18	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	18 0.09763
	PRINTING	19	0.00051	0.00037	0.00000	0.00014	0.00072	0.00287	19 0.03316
	CHEMICAL PRODUCTS	20	0.00090	0.00015	0.00000	0.00149	0.00013	0.00053	20 0.16379
	PLASTIC & PETROLEUM	21	0.00430	0.02989	0.00000	0.00406	0.00047	0.01901	21 0.48214
	GLASS AND STONE PRODS.	22	0.00001	0.00001	0.00000	0.00002	0.00000	0.00001	22 0.16691
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23 0.00000
	FABRICATED METAL PRODS	24	0.00001	0.00000	0.00000	0.00001	0.00000	0.00000	24 0.01841
	MACHINERY	25	0.00238	0.00017	0.01535	0.00337	0.00012	0.00048	25 0.12043
	ELECTRICAL PRODS.	26	0.00008	0.00000	0.00000	0.00006	0.00000	0.00000	26 0.01375
	TRANSPRTN & WRSNG	27	0.00803	0.08829	0.00977	0.01274	0.00395	0.01578	27 0.83680
	COMMUNICATIONS	28	0.01478	0.00861	0.00259	0.01371	0.00280	0.01119	28 0.26830
	ELECTRICAL UTILITY	29	0.00214	0.01622	0.04470	0.00445	0.00354	0.01416	29 0.48067
	GAS UTILITY	30	0.00262	0.00338	0.00000	0.00377	0.00207	0.00828	30 0.53547
	WATER AND SEWER	31	0.00118	0.00114	0.00000	0.00119	0.00085	0.00340	31 0.06831
	WHOLESALE TRADE	32	0.01323	0.02379	0.00250	0.01423	0.01102	0.04406	32 1.59229
	RETAIL TRADE	33	0.01652	0.01069	0.00138	0.00674	0.03834	0.15335	33 0.72415
	F. I. & R.E	34	0.03435	0.01853	0.00694	0.03167	0.01140	0.04561	34 1.16017
	LODG, PERS,& REP SER	35	0.01584	0.02424	0.00064	0.01177	0.01291	0.05163	35 0.44278
	BUSINESS & MISC. SERV.	36	0.05497	0.00894	0.00000	0.01345	0.00179	0.00714	36 0.80892
	MEDICAL & NON-PROFIT	37	0.00221	0.00052	0.00119	0.00188	0.00238	0.00953	37 0.05452
	WIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38 0.00000
	WIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39 0.00000
	WIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40 0.00000
	WIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41 0.00000
	WIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42 0.00000
	WIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43 0.00000
	WIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44 0.00000
	WIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45 0.00000
	WIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46 0.00000
	WIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47 0.00000
	WIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48 0.00000
	WIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49 0.00000
	WIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50 0.00000
	WIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51 0.00000
	GOVERNMENT	52	0.00000	0.00000	0.00000	0.03548	0.02100	0.08500	52 0.83762
	HOUSEHOLDS/PC WEEKLY	53	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	53 0.41131
	HOUSEHOLDS/PC LOCAL	54	0.57448	0.56290	0.54173	0.45300	0.00000	0.00000	54 15.35617
*** COLUMN SUMS ***		0.75349	0.82482	0.62884	0.63481	0.11849	0.49198		

Table A-2
WIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979
DIRECT, INDIRECT AND INDUCED COEFFICIENTS
INDUSTRY PURCHASING

		1	2	3	4	5	6	7	8		
INDUSTY	LIVESTK & LIVESTK PROD	1	1.51090	0.04604	0.15328	0.02313	0.24603	0.00534	0.00194	0.00110	1
	COTTON	2	0.00433	1.01744	0.00089	0.00050	0.00327	0.00184	0.00090	0.00050	2
	GRAINS AND SEEDS	3	0.41657	0.01399	1.07351	0.00712	0.06893	0.00995	0.00111	0.00069	3
	FRUITS AND VEGETABLES	4	0.00102	0.00038	0.00031	1.00402	0.00051	0.00127	0.00042	0.00022	4
	FORESTRY&FISHERY PRODS	5	0.00024	0.00030	0.00026	0.00019	1.07792	0.00041	0.00053	0.00025	5
	AGRICULTURAL SERVICES	6	0.01001	0.10394	0.01452	0.05937	0.03017	1.00057	0.00034	0.00022	6
	MISC MET & NON-MET MIN	7	0.00009	0.00011	0.00023	0.00009	0.00002	0.00000	1.00846	0.00001	7
	CRUDE PETROLEUM	8	0.01322	0.02325	0.02150	0.00923	0.02268	0.00558	0.00774	1.00833	8
	NATURAL GAS & LIQ. PET	9	0.00206	0.00297	0.00260	0.00147	0.00298	0.00178	0.00301	0.00194	9
	STONE, GRAVEL AND SAND	10	0.00091	0.00157	0.00212	0.00105	0.00020	0.00005	0.00007	0.00023	10
	POTASH MINING	11	0.00055	0.00080	0.00137	0.00061	0.00010	0.00002	0.00018	0.00003	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.01447	0.01803	0.01623	0.01079	0.00666	0.00343	0.00699	0.03197	15
	FOOD PRODUCTS	16	0.04040	0.00657	0.00814	0.00411	0.03027	0.00810	0.00840	0.00453	16
	FABRICS AND APPAREL	17	0.00015	0.00017	0.00014	0.00010	0.00017	0.00011	0.00016	0.00010	17
	WOOD & LUMBER PROD.	18	0.00010	0.00012	0.00010	0.00007	0.00007	0.00004	0.00042	0.00015	18
	PRINTING	19	0.00108	0.00141	0.00111	0.00081	0.00148	0.00153	0.00165	0.00120	19
	CHEMICAL PRODUCTS	20	0.00477	0.00643	0.00835	0.00313	0.00217	0.00061	0.02340	0.00380	20
	PLASTIC & PETROLEUM	21	0.02844	0.05023	0.04648	0.01886	0.04896	0.01173	0.01613	0.01224	21
	GLASS AND STONE PRODS.	22	0.00013	0.00018	0.00020	0.00012	0.00007	0.00003	0.00005	0.00012	22
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00001	0.00001	0.00001	0.00001	0.00002	0.00000	0.00001	0.00010	24
	MACHINERY	25	0.00061	0.00086	0.00064	0.00046	0.00057	0.00053	0.01154	0.00049	25
	ELECTRICAL PRODS.	26	0.00001	0.00002	0.00002	0.00001	0.00002	0.00001	0.00003	0.00001	26
	TRNSPRTN & WRHSNG	27	0.03758	0.02361	0.02700	0.01647	0.02285	0.01141	0.02348	0.00956	27
	COMMUNICATIONS	28	0.00934	0.01150	0.00898	0.00617	0.00853	0.00766	0.01163	0.00736	28
	ELECTRICAL UTILITY	29	0.01161	0.01802	0.01038	0.00888	0.01108	0.00989	0.02340	0.01873	29
	GAS UTILITY	30	0.00589	0.00781	0.00638	0.00457	0.00847	0.00784	0.01326	0.00828	30
	WATER AND SEWER	31	0.00496	0.01079	0.00955	0.00904	0.00280	0.00225	0.00246	0.00225	31
	WHOLESALE TRADE	32	0.05286	0.05887	0.05080	0.03878	0.05948	0.02457	0.03643	0.02022	32
	RETAIL TRADE	33	0.06697	0.08122	0.06936	0.04510	0.07780	0.07313	0.07814	0.04827	33
	F. I. & R.E	34	0.05689	0.11283	0.07563	0.04115	0.05798	0.03306	0.04404	0.12074	34
	LODG, PERS,& REP SER	35	0.02482	0.03111	0.02352	0.01783	0.03298	0.02759	0.03039	0.01928	35
	BUSINESS & MISC. SERV.	36	0.02349	0.04582	0.04065	0.02363	0.01368	0.00872	0.01922	0.02643	36
	MEDICAL & NON-PROFIT	37	0.00402	0.00473	0.00374	0.00285	0.00467	0.00488	0.00646	0.00384	37
	WIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	WIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	WIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	WIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	WIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	WIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	WIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	WIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	WIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	WIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	WIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	WIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	WIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	WIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.02872	0.03973	0.03253	0.02583	0.04067	0.04454	0.04891	0.02978	52
	HOUSEHOLDS/PC WEEKLY	53	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	53
	HOUSEHOLDS/PC LOCAL	54	0.24680	0.30595	0.25042	0.19910	0.39272	0.45748	0.47816	0.25761	54
*** COLUMN SUMS ***			2.62411	2.04678	1.96093	1.58565	2.27698	1.76597	1.90946	1.64059	

Table A-2 (cont'd.)
WIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979
DIRECT, INDIRECT AND INDUCED COEFFICIENTS
INDUSTRY PURCHASING

		9	10	11	12	13	14	15	16		
INDUSTRY SECTOR	LIVESTK & LIVESTK PROD	1	0.00144	0.00234	0.00174	0.00255	0.00248	0.00246	0.00302	0.12352	1
	COTTON	2	0.00064	0.00109	0.00081	0.00121	0.00115	0.00115	0.00143	0.11033	2
	GRAINS AND SEEDS	3	0.00090	0.00141	0.00100	0.00182	0.00162	0.00169	0.00176	0.05911	3
	FRUITS AND VEGETABLES	4	0.00029	0.00047	0.00037	0.00050	0.00049	0.00049	0.00061	0.00193	4
	FORESTRY&FISHERY PRODS	5	0.00034	0.00055	0.00047	0.00058	0.00056	0.00056	0.00068	0.00030	5
	AGRICULTURAL SERVICES	6	0.00030	0.00045	0.00030	0.00189	0.00125	0.00331	0.00103	0.01259	6
	MISC MET & NON-MET MIN	7	0.00002	0.00001	0.00003	0.00001	0.00001	0.00001	0.00001	0.00008	7
	CRUDE PETROLEUM	8	0.00811	0.01468	0.00990	0.01160	0.01319	0.02214	0.01335	0.00938	8
	NATURAL GAS & LIQ. PET	9	1.17713	0.00426	0.00916	0.00313	0.00323	0.00387	0.00348	0.00247	9
	STONE, GRAVEL AND SAND	10	0.00032	1.00839	0.00007	0.00391	0.00522	0.02274	0.00689	0.00047	10
	POTASH MINING	11	0.00008	0.00055	1.01431	0.00002	0.00003	0.00005	0.00002	0.00017	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.04434	0.01570	0.00762	0.00720	0.00743	0.00808	1.00715	0.00922	15
	FOOD PRODUCTS	16	0.00589	0.01007	0.00751	0.01085	0.01065	0.01043	0.01321	1.03388	16
	FABRICS AND APPAREL	17	0.00014	0.00027	0.00015	0.00139	0.00031	0.00095	0.00037	0.00037	17
	WOOD & LUMBER PROD.	18	0.00021	0.00030	0.00059	0.03830	0.01209	0.00224	0.00395	0.00007	18
	PRINTING	19	0.00159	0.00209	0.00148	0.00223	0.00220	0.00214	0.00262	0.00254	19
	CHEMICAL PRODUCTS	20	0.01050	0.00788	0.02170	0.00162	0.00308	0.00403	0.00143	0.00282	20
	PLASTIC & PETROLEUM	21	0.01588	0.03098	0.01899	0.02455	0.02802	0.04750	0.02830	0.01987	21
	GLASS AND STONE PRODS.	22	0.00017	0.05705	0.00005	0.02762	0.03650	0.02337	0.00341	0.00009	22
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00006	0.00001	0.00001	0.00197	0.00310	0.00188	0.00048	0.00001	24
	MACHINERY	25	0.00068	0.00628	0.01642	0.00156	0.00182	0.00167	0.00130	0.00053	25
	ELECTRICAL PRODS.	26	0.00002	0.00003	0.00003	0.00023	0.00032	0.00026	0.00010	0.00002	26
	TRANSPRTTN & WHRSNG	27	0.01275	0.03849	0.02270	0.05020	0.05228	0.07166	0.04317	0.03909	27
	COMMUNICATIONS	28	0.00896	0.01234	0.01066	0.01654	0.01802	0.01692	0.01634	0.01229	28
	ELECTRICAL UTILITY	29	0.01685	0.04348	0.03226	0.01718	0.01685	0.01719	0.01875	0.01617	29
	GAS UTILITY	30	0.03337	0.01743	0.04859	0.01230	0.01224	0.01231	0.01389	0.00958	30
	WATER AND SEWER	31	0.00358	0.00602	0.00226	0.00376	0.00383	0.00374	0.00411	0.00358	31
	WHOLESALE TRADE	32	0.03213	0.06957	0.02708	0.08919	0.08641	0.07947	0.08083	0.05706	32
	RETAIL TRADE	33	0.08323	0.10556	0.07059	0.18589	0.14757	0.13585	0.18448	0.05893	33
	F. I. & R.E	34	0.16825	0.07980	0.04067	0.06006	0.06247	0.06105	0.06298	0.04640	34
	LODG, PERS.& REP SER	35	0.02541	0.04856	0.02751	0.04626	0.04833	0.04827	0.05147	0.02661	35
	BUSINESS & MISC. SERV.	36	0.03654	0.04972	0.01914	0.07343	0.09163	0.06142	0.03756	0.02324	36
	MEDICAL & NON-PROFIT	37	0.00508	0.00669	0.00594	0.00776	0.00806	0.00776	0.00876	0.00438	37
	WIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	WIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	WIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	WIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	WIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	WIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	WIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	WIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	WIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	WIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	WIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	WIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	WIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	WIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.03963	0.06004	0.04429	0.06363	0.06263	0.06095	0.07548	0.03393	52
	HOUSEHOLDS/PC WEEKLY	53	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	53
	HOUSEHOLDS/PC LOCAL	54	0.33318	0.56905	0.42858	0.60984	0.59855	0.58792	0.74892	0.30990	54
*** COLUMN SUMS ***			2.04698	2.27161	1.89298	2.29085	2.34460	2.32560	2.44131	2.03090	

Table A-2 (cont'd.)

WIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979
DIRECT, INDIRECT AND INDUCED COEFFICIENTS

		INDUSTRY PURCHASING									
		17	18	19	20	21	22	23	24		
A-13 INDUSTRIES	LIVESTK & LIVESTK PROD	1	0.01735	0.00186	0.00164	0.00359	0.00142	0.00250	0.00161	0.00191	1
	COTTON	2	0.03825	0.00090	0.00080	0.00128	0.00085	0.00117	0.00076	0.00092	2
	GRAINS AND SEEDS	3	0.00543	0.00110	0.00096	0.00185	0.00089	0.00153	0.00090	0.00111	3
	FRUITS AND VEGETABLES	4	0.00042	0.00037	0.00034	0.00171	0.00029	0.00050	0.00033	0.00039	4
	FORESTRY&FISHERY PRODS	5	0.01878	0.00044	0.00044	0.00481	0.00034	0.00057	0.00037	0.00044	5
	AGRICULTURAL SERVICES	6	0.00474	0.00037	0.00031	0.00065	0.00028	0.00046	0.00027	0.00035	6
	MISC MET & NON-MET MIN	7	0.00001	0.00001	0.00002	0.00133	0.00006	0.00001	0.00000	0.00000	7
	CRUDE PETROLEUM	8	0.00794	0.00764	0.00674	0.03651	0.49197	0.01495	0.00474	0.00828	8
	NATURAL GAS & LIQ. PET	9	0.00245	0.00260	0.00223	0.01051	0.03421	0.00502	0.00155	0.00315	9
	STONE, GRAVEL AND SAND	10	0.00012	0.00009	0.00007	0.00052	0.00023	0.06838	0.00003	0.00016	10
	POTASH MINING	11	0.00005	0.00003	0.00011	0.00808	0.00007	0.00006	0.00001	0.00001	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.00688	0.00793	0.00777	0.01292	0.03091	0.01268	0.00287	0.00708	15
	FOOD PRODUCTS	16	0.00948	0.00805	0.00694	0.01184	0.00597	0.01070	0.00709	0.00828	16
	FABRICS AND APPAREL	17	1.11241	0.00109	0.00176	0.00045	0.00022	0.00081	0.00010	0.00101	17
	WOOD & LUMBER PROD.	18	0.00007	1.00811	0.00007	0.00010	0.00015	0.00022	0.00003	0.00152	18
	PRINTING	19	0.00177	0.00167	1.01754	0.00221	0.00140	0.00230	0.00136	0.00166	19
	CHEMICAL PRODUCTS	20	0.00186	0.00355	0.01409	1.05419	0.00887	0.00276	0.00047	0.00141	20
	PLASTIC & PETROLEUM	21	0.01672	0.01600	0.01416	0.07794	1.07140	0.03134	0.00894	0.01724	21
	GLASS AND STONE PRODS.	22	0.00007	0.00043	0.00006	0.00011	0.00013	1.02896	0.00003	0.00025	22
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00001	0.00001	0.00001	0.00006	0.00007	0.00001	0.00000	1.00142	24
	MACHINERY	25	0.00066	0.00258	0.00061	0.00097	0.00057	0.00445	0.00047	0.02475	25
	ELECTRICAL PRODS.	26	0.00002	0.00003	0.00004	0.00005	0.00002	0.00003	0.00001	0.00005	26
	TRNSPRTN & WRHSNG	27	0.02509	0.04246	0.02383	0.04131	0.04417	0.15385	0.00928	0.02917	27
	COMMUNICATIONS	28	0.01316	0.01316	0.01936	0.01518	0.00909	0.01879	0.00673	0.01392	28
	ELECTRICAL UTILITY	29	0.02016	0.01832	0.01519	0.03091	0.02165	0.02568	0.00869	0.01811	29
	GAS UTILITY	30	0.01022	0.01077	0.00932	0.03013	0.02642	0.01917	0.00689	0.01421	30
	WATER AND SEWER	31	0.00347	0.00241	0.00280	0.00579	0.00437	0.00364	0.00192	0.00253	31
	WHOLESALE TRADE	32	0.05970	0.07267	0.04255	0.05487	0.03035	0.06691	0.02103	0.05073	32
	RETAIL TRADE	33	0.08485	0.07546	0.06942	0.10223	0.05998	0.10247	0.06455	0.08448	33
	F. I. & R.E	34	0.05319	0.05122	0.04991	0.06656	0.08850	0.07117	0.02776	0.04912	34
	LODG, PERS.& REP SER	35	0.03333	0.03134	0.02968	0.04050	0.02450	0.04715	0.02441	0.03106	35
	BUSINESS & MISC. SERV.	36	0.02081	0.02072	0.03904	0.03070	0.03077	0.03610	0.00734	0.02036	36
	MEDICAL & NON-PROFIT	37	0.00603	0.00556	0.00608	0.00744	0.00457	0.00768	0.00432	0.00576	37
	WIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	WIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	WIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	WIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	WIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	WIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	WIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	WIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	WIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	WIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	WIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	WIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	WIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	WIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.05227	0.04633	0.04722	0.06385	0.03859	0.06236	0.03950	0.04763	52
	HOUSEHOLDS/PC WEEKLY	53	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	53
	HOUSEHOLDS/PC LOCAL	54	0.49854	0.45192	0.39293	0.61410	0.33882	0.60640	0.40704	0.46956	54
*** COLUMN SUMS ***			2.12624	1.90719	1.82400	2.33523	2.38191	2.41090	1.66242	1.91802	

Table A-2 (cont'd.)
 WIPP II INPUT/OUTPUT TABLES, LEA AND CODY COUNTIES, NOVEMBER 1979
 DIRECT, INDIRECT AND INDUCED COEFFICIENTS
 INDUSTRY PURCHASING

		25	26	27	28	29	30	31	32		
INDUSTRY SELLING	LIVESTK & LIVESTK PROD	1	0.00232	0.00203	0.00304	0.00248	0.00111	0.00170	0.00277	0.00303	1
	COTTON	2	0.00112	0.00098	0.00131	0.00111	0.00053	0.00080	0.00129	0.00160	2
	GRAINS AND SEEDS	3	0.00135	0.00117	0.00325	0.00159	0.00067	0.00099	0.00165	0.00177	3
	FRUITS AND VEGETABLES	4	0.00047	0.00041	0.00056	0.00048	0.00022	0.00035	0.00056	0.00053	4
	FORESTRY&FISHERY PRODS	5	0.00053	0.00047	0.00065	0.00053	0.00026	0.00039	0.00063	0.00060	5
	AGRICULTURAL SERVICES	6	0.00045	0.00037	0.00054	0.00042	0.00021	0.00032	0.00053	0.00168	6
	MISC MET & NON-MET MIN	7	0.00001	0.00000	0.00006	0.00000	0.00000	0.00001	0.00001	0.00001	7
	CRUDE PETROLEUM	8	0.01032	0.01003	0.02553	0.00837	0.01224	0.04419	0.01266	0.01249	8
	NATURAL GAS & LIQ. PET	9	0.00308	0.00293	0.01031	0.00284	0.01805	0.27118	0.00860	0.00323	9
	STONE, GRAVEL AND SAND	10	0.00008	0.00007	0.00023	0.00015	0.00025	0.00027	0.00061	0.00012	10
	POTASH MINING	11	0.00001	0.00001	0.00002	0.00001	0.00003	0.00003	0.00003	0.00002	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.00745	0.00762	0.03048	0.01997	0.03500	0.03746	0.08606	0.00768	15
	FOOD PRODUCTS	16	0.01014	0.00876	0.01204	0.01021	0.00478	0.00733	0.01188	0.01456	16
	FABRICS AND APPAREL	17	0.00104	0.00115	0.00071	0.00040	0.00037	0.00028	0.00062	0.00126	17
	WOOD & LUMBER PROD.	18	0.03403	0.00007	0.00018	0.00012	0.00016	0.00018	0.00045	0.00045	18
	PRINTING	19	0.00202	0.00419	0.00282	0.00220	0.00097	0.00157	0.00252	0.00292	19
	CHEMICAL PRODUCTS	20	0.00121	0.00074	0.00143	0.00079	0.00159	0.00301	0.00359	0.00168	20
	PLASTIC & PETROLEUM	21	0.02176	0.02115	0.05300	0.01754	0.02201	0.01405	0.02520	0.02647	21
	GLASS AND STONE PRODS.	22	0.00009	0.00008	0.00016	0.00010	0.00014	0.00015	0.00034	0.00056	22
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00003	0.00001	0.00002	0.00001	0.00002	0.00003	0.00005	0.00002	24
	MACHINERY	25	1.02056	0.00066	0.00119	0.00100	0.00039	0.00068	0.00301	0.00137	25
	ELECTRICAL PRODS.	26	0.00086	1.01089	0.00003	0.00003	0.00001	0.00002	0.00007	0.00009	26
	TRANSPRTN & WRHSNG	27	0.03686	0.02503	1.11581	0.01637	0.03271	0.01249	0.03041	0.03355	27
	COMMUNICATIONS	28	0.01451	0.01691	0.02248	1.02385	0.00824	0.01220	0.02594	0.02412	28
	ELECTRICAL UTILITY	29	0.01963	0.01821	0.03560	0.01996	1.08655	0.01655	0.04938	0.01948	29
	GAS UTILITY	30	0.01281	0.01242	0.01976	0.01262	0.06233	1.58053	0.04357	0.01268	30
	WATER AND SEWER	31	0.00345	0.00274	0.00494	0.00440	0.00256	0.00362	1.00528	0.00508	31
	WHOLESALE TRADE	32	0.07915	0.04771	0.06482	0.03620	0.02363	0.02800	0.05375	1.05116	32
	RETAIL TRADE	33	0.09930	0.08823	0.12321	0.10029	0.04809	0.07356	0.12172	0.11992	33
	F. I. & R.E	34	0.05733	0.05846	0.07615	0.05806	0.02929	0.07663	0.08804	0.07305	34
	LODG. PERS.& REP SER	35	0.03749	0.03383	0.07072	0.10101	0.02020	0.02806	0.05884	0.05936	35
	BUSINESS & MISC. SERV.	36	0.02096	0.02572	0.02736	0.02375	0.01254	0.02464	0.03459	0.03438	36
	MEDICAL & NON-PROFIT	37	0.00680	0.00686	0.00820	0.00712	0.00337	0.00541	0.00932	0.00316	37
	WIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	WIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	WIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	WIPP A/G CONST 1983	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	WIPP A/G CONST 1984	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	WIPP CONST MNTG & DSGN	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	WIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	WIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	WIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	WIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	WIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	WIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	WIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	WIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.05780	0.05196	0.07246	0.06157	0.03168	0.06621	0.66433	0.08602	52
	HOUSEHOLDS/PC WEEKLY	53	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	53
	HOUSEHOLDS/PC LOCAL	54	0.57183	0.49829	0.68086	0.58435	0.27216	0.41856	0.67710	0.63849	54
*** COLUMN SUMS ***			2.13683	1.96017	2.46992	2.11990	1.73037	2.73144	3.02550	2.23361	

Table A-2 (cont'd.)

HIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979
DIRECT, INDIRECT AND INDUCED COEFFICIENTS
INDUSTRY PURCHASING

	33	34	35	36	37	38	39	40	
LIVESTK & LIVESTK PROD	0.00251	0.00323	0.00454	0.00272	0.00338	0.00119	0.00078	0.00135	1
COTTON	0.00118	0.00128	0.00114	0.00126	0.00156	0.00058	0.00037	0.00054	2
GRAINS AND SEEDS	0.00146	0.00241	0.00553	0.00162	0.00189	0.00075	0.00052	0.00084	3
FRUITS AND VEGETABLES	0.00050	0.00054	0.00047	0.00057	0.00068	0.00023	0.00015	0.00027	4
FORESTRY&FISHERY PRODS	0.00056	0.00059	0.00054	0.00081	0.00074	0.00026	0.00017	0.00030	5
AGRICULTURAL SERVICES	0.00043	0.00077	0.00070	0.00048	0.00060	0.00080	0.00053	0.00032	6
MISC NET & NON-NET MIN	0.00000	0.00000	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	7
CRUDE PETROLEUM	0.01037	0.01012	0.01159	0.01071	0.01468	0.00401	0.00283	0.00448	8
NATURAL GAS & LIQ. PET	0.00370	0.00398	0.00356	0.00371	0.00487	0.00123	0.00084	0.00139	9
STONE, GRAVEL AND SAND	0.00003	0.00025	0.00014	0.00011	0.00016	0.00053	0.00052	0.00054	10
POTASH MINING	0.00001	0.00003	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	11
RESIDENTIAL CONST.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
NONRESIDENTIAL CONSTR	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
ALL OTHER CONST.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
CONST. MAINTENANCE	0.00987	0.02648	0.01434	0.01231	0.01877	0.00274	0.00201	0.00303	15
FOOD PRODUCTS	0.01092	0.01117	0.00980	0.01167	0.01440	0.00519	0.00339	0.00520	16
FABRICS AND APPAREL	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17
WOOD & LUMBER PROD.	0.00006	0.00017	0.00024	0.00018	0.00014	0.00008	0.00005	0.00009	18
PRINTING	0.00270	0.00553	0.00216	0.00294	0.00802	0.00104	0.00069	0.00117	19
CHEMICAL PRODUCTS	0.00092	0.00115	0.00119	0.00191	0.00140	0.00046	0.00034	0.00051	20
PLASTIC & PETROLEUM	0.02183	0.02104	0.02439	0.02241	0.03079	0.00844	0.00597	0.00742	21
GLASS AND STONE PRODS.	0.00007	0.00014	0.00013	0.00010	0.00012	0.00048	0.00047	0.00048	22
PRIMARY METAL PRODS.	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
FABRICATED METAL PRODS	0.00001	0.00002	0.00001	0.00002	0.00001	0.00137	0.00136	0.00137	24
MACHINERY	0.00091	0.00119	0.00486	0.00350	0.00120	0.00057	0.00045	0.00062	25
ELECTRICAL PRODS.	0.00002	0.00004	0.00012	0.00012	0.00089	0.00001	0.00001	0.00001	26
TRANSPRTN & WRMING	0.01744	0.02115	0.02051	0.02601	0.02490	0.01283	0.01047	0.01376	27
COMMUNICATIONS	0.01726	0.02945	0.01786	0.02849	0.02931	0.01032	0.00861	0.01100	28
ELECTRICAL UTILITY	0.02966	0.02630	0.02715	0.01837	0.03877	0.00799	0.00578	0.00828	29
GAS UTILITY	0.01683	0.01568	0.01539	0.01658	0.02145	0.00517	0.00342	0.00585	30
WATER AND SEWER	0.00547	0.00763	0.00661	0.00481	0.01089	0.00157	0.00108	0.00176	31
WHOLESALE TRADE	0.03917	0.04298	0.05636	0.05078	0.06582	0.08269	0.07735	0.08481	32
RETAIL TRADE	1.10289	0.11349	0.10672	0.12510	0.14936	0.04668	0.03028	0.05318	33
F. I. & R.E	0.08293	1.14469	0.08719	0.08937	0.12952	0.03119	0.02414	0.03398	34
LODG, PERS. & REP SER	0.04664	0.04636	1.07664	0.05986	0.07271	0.02127	0.01507	0.02372	35
BUSINESS & MISC. SERV.	0.02301	0.07614	0.02748	1.07449	0.04643	0.00801	0.00614	0.00674	36
MEDICAL & NON-PROFIT	0.00775	0.01480	0.00841	0.00986	1.01268	0.00328	0.00218	0.00371	37
HIPP A/G CONST 1980	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	38
HIPP A/G CONST 1981	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	39
HIPP A/G CONST 1982	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	40
HIPP A/G CONST 1983	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
HIPP A/G CONST 1984	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
HIPP CONST MNTG & DSGN	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
HIPP B/G CONST 1980	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
HIPP B/G CONST 1981	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
HIPP B/G CONST 1982	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
HIPP B/G CONST 1983	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
HIPP B/G CONST 1984	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
HIPP GEN OPER A/G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
HIPP SECUR RM HANDLING	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
HIPP OPER B/G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
GOVERNMENT	0.08058	0.09927	0.06277	0.08188	0.09844	0.02844	0.01841	0.03241	52
HOUSEHOLDS/PC WEEKLY	0.00000	0.00000	0.00000	0.00000	0.00000	0.02612	0.01410	0.03087	53
HOUSEHOLDS/PC LOCAL	0.61520	0.63006	0.55908	0.66581	0.80134	0.27800	0.17761	0.31778	54
*** COLUMN SUMS ***	2.15278	2.35848	2.15966	2.32859	2.80450	1.60043	1.42324	1.67062	

Table A-2 (cont'd.)

MIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979
DIRECT, INDIRECT AND INDUCED COEFFICIENTS
INDUSTRY PURCHASING

		41	42	43	44	45	46	47	48	
I N D U S T R Y S E C T O R	LIVESTK & LIVESTK PROD	1	0.00178	0.00160	0.00328	0.00174	0.00182	0.00186	0.00172	1
	COTTON	2	0.00084	0.00076	0.00152	0.00083	0.00081	0.00089	0.00082	2
	GRAINS AND SEEDS	3	0.00108	0.00098	0.00193	0.00100	0.00110	0.00106	0.00099	3
	FRUITS AND VEGETABLES	4	0.00038	0.00032	0.00066	0.00035	0.00039	0.00037	0.00035	4
	FORESTRY&FISHERY PRODS	5	0.00039	0.00035	0.00074	0.00039	0.00043	0.00042	0.00038	5
	AGRICULTURAL SERVICES	6	0.00069	0.00066	0.00057	0.00038	0.00041	0.00040	0.00037	6
	MISC MET & NON-MET MIN	7	0.00000	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	7
	CRUDE PETROLEUM	8	0.00572	0.00519	0.01230	0.00546	0.00595	0.00596	0.00539	8
	NATURAL GAS & LIQ. PET	9	0.00180	0.00162	0.00422	0.00186	0.00203	0.00197	0.00184	9
	STONE, GRAVEL AND SAND	10	0.00754	0.00754	0.00011	0.00274	0.00275	0.00275	0.00274	10
	POTASH MINING	11	0.00001	0.00001	0.00002	0.00001	0.00001	0.00001	0.00001	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONSTR	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.00380	0.00347	0.01298	0.00380	0.00411	0.00401	0.00376	15
	FOOD PRODUCTS	16	0.00780	0.00700	0.01412	0.00772	0.00848	0.00823	0.00762	16
	FABRICS AND APPAREL	17	0.00019	0.00018	0.00026	0.00020	0.00021	0.00020	0.00020	17
	WOOD & LUMBER PROD.	18	0.00007	0.00007	0.00019	0.00012	0.00012	0.00012	0.00012	18
	PRINTING	19	0.00153	0.00138	0.00341	0.00150	0.00165	0.00160	0.00148	19
	CHEMICAL PRODUCTS	20	0.00063	0.00058	0.00205	0.00060	0.00065	0.00063	0.00059	20
	PLASTIC & PETROLEUM	21	0.01202	0.01082	0.02576	0.01143	0.01247	0.01248	0.01130	21
	GLASS AND STONE PRODS.	22	0.00049	0.00049	0.00010	0.00022	0.00023	0.00023	0.00022	22
	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00137	0.00137	0.00002	0.00051	0.00052	0.00052	0.00051	24
	MACHINERY	25	0.00075	0.00069	0.00382	0.00202	0.00207	0.00207	0.00201	25
	ELECTRICAL PRODS.	26	0.00002	0.00002	0.00013	0.00002	0.00002	0.00002	0.00002	26
	TRANSPRTN & MRHSNG	27	0.01624	0.01518	0.02800	0.01597	0.01698	0.01664	0.01585	27
	COMMUNICATIONS	28	0.01279	0.01203	0.03080	0.00885	0.00968	0.00944	0.00883	28
	ELECTRICAL UTILITY	29	0.01118	0.01020	0.02129	0.01937	0.02030	0.02032	0.01935	29
	GAS UTILITY	30	0.00770	0.00692	0.01887	0.00798	0.00872	0.00848	0.00789	30
	WATER AND SEWER	31	0.00227	0.00206	0.00545	0.00223	0.00243	0.00237	0.00220	31
	WHOLESALE TRADE	32	0.08043	0.08804	0.05781	0.08844	0.10071	0.09997	0.09817	32
	RETAIL TRADE	33	0.07043	0.06311	0.14726	0.06944	0.07638	0.07650	0.06858	33
	F. I. & R.E	34	0.04140	0.03825	0.09844	0.03568	0.03867	0.03770	0.03532	34
	LOGG, PERS. & REP SER	35	0.03025	0.02748	0.06809	0.02997	0.03259	0.03264	0.02854	35
	BUSINESS & MISC. SERV.	36	0.01071	0.00987	0.07678	0.01032	0.01111	0.01113	0.01086	36
	MEDICAL & NON-PROFIT	37	0.00487	0.00438	0.01133	0.00480	0.00527	0.00528	0.00475	37
	MIPP A/G CONST 1980	38	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38
	MIPP A/G CONST 1981	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39
	MIPP A/G CONST 1982	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	40
	MIPP A/G CONST 1983	41	1.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	MIPP A/G CONST 1984	42	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	MIPP CONST MNTG & DSGN	43	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000	43
	MIPP B/G CONST 1980	44	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	44
	MIPP B/G CONST 1981	45	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	45
	MIPP B/G CONST 1982	46	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	46
	MIPP B/G CONST 1983	47	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	47
	MIPP B/G CONST 1984	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	48
	MIPP GEN OPER A/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	MIPP SECU RM HANDLING	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	MIPP OPER B/G	51	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	51
	GOVERNMENT	52	0.04296	0.03849	0.08208	0.04221	0.04646	0.04653	0.04163	52
	HOUSEHOLDS/PC WEEKLY	53	0.04351	0.03817	0.00000	0.04873	0.05452	0.05482	0.04812	53
	HOUSEHOLDS/PC LOCAL	54	0.42339	0.37650	0.80638	0.41573	0.45809	0.45878	0.41125	54
** COLUMN SUMS **			1.85702	1.77799	2.54136	1.83273	1.92821	1.93956	1.80360	

Table A-2 (cont'd.)

WIPP II INPUT/OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1979
DIRECT, INDIRECT AND INDUCED COEFFICIENTS
INDUSTRY PURCHASING

		49	50	51	52	53	54	*** ROW SUMS ***
INDUSTRY <								

Once having determined by subsector the number of dollars for labor costs flowing on an annual basis, the average labor unit cost is divided into each gross amount to determine the actual number of jobs supported in that specific subsector due to an exogenous increase in the specific activity being investigated, e.g., WIPP aboveground construction, belowground construction, aboveground operation, etc.

A.3.1 Wages

First, the level of wages must be determined. The average annual wages and labor cost figures for each of the 37 private and one governmental (state, local and federal) identified economic subsectors are listed in Table A-3.

Average employee costs for all of the 38 identified subsectors in the input-output model were computed from available NMESD information. Since complete 1979 data were not available, the 1978 average wage for the area was derived from Covered Employment and Wages, Quarterly Report. Estimates were made for the increase in wages from 1978 to 1979 for each sector.

Expected fringe benefits were added to the subsectors wages. The percentage of fringe benefits added to the wages was computed in several ways. First, several companies were contacted concerning additional costs for labor due to fringe benefits. These companies were principally in the construction, petroleum, and mining industries. For other areas where large companies are not predominant, averages were used which reflected minimum fringe benefits at various salary levels. Thus, the labor cost per employee is the estimated annual wage paid in 1977 plus the expected fringe benefit percentage. Table A-3 gives the annual wage, fringe benefit percent, and estimated annual labor cost for the 37 identified economic subsectors plus the government sector. The government sector annual wage was derived from Bureau of Economic Analysis data.

A.3.2 Calculating Indirect Job Impact

Detailed calculations for the derivation of all indirect jobs created by WIPP in Eddy and Lea Counties are too extensive to list here. However, listed below is a sample calculation that illustrates the procedure used to determine the estimated number of new indirect jobs created by WIPP in the two-county area.

The first step in the procedure is to determine the annual flow of dollars going through the economy due to the increase in activity in a specific economic subsector. The example used in this case is aboveground construction and the year is 1983. It is estimated that the new dollars brought to the area due to aboveground construction in 1983 will be \$53.113 million. This direct impact in construction is then multiplied by the coefficients listed in the

Table A-3. Estimated Annual Wages and Labor Costs per Employee by Subsector:
Eddy and Lea Counties (1979) ^a

IO Subsector	Estimated Annual Wages (1979)	Estimated Fringe Benefits (percent)	Estimated Annual Labor Costs per Employee (1979)
1. Livestock & Livestock Prod.	9,320	10.0	10,252
2. Cotton	7,585	10.0	8,343
3. Grains & Seeds	7,585	10.0	8,343
4. Fruits & Vegetables	7,585	10.0	8,343
5. Forestry & Fishery Products	9,298	16.0	10,786
6. Agricultural Services	9,298	16.0	10,786
7. Misc. Metal & Other Minerals	17,321	28.0	22,171
8. Crude Petroleum	16,567	28.0	21,206
9. Nat. Gas & Liquid Petroleum	16,567	28.0	21,206
10. Stone Gravel & Sand	17,321	28.0	22,171
11. Potash Mining	17,321	28.0	22,171
12. Residential Construction	10,545	20.0	12,654
13. Nonresidential Construction	12,808	25.0	16,010
14. All Other Construction	11,573	25.0	14,466
15. Construction Maintenance	11,052	15.0	12,710
16. Food Products	10,181	16.0	11,810
17. Fabrics & Apparel	7,818	17.0	9,147
18. Wood & Lumber Products	11,097	16.0	12,873
19. Printing	9,989	16.0	11,587
20. Chemical Products	18,618	15.0	21,411
21. Plastic & Petroleum	21,227	15.0	24,411
22. Glass & Stone Products	12,666	16.0	14,693
23. Primary Metal Products	*	*	*
24. Fabricated Metal Products	12,323	16.0	14,295
25. Machinery	13,177	16.0	15,285
26. Electrical Products	10,399	16.0	12,063
27. Transport. & Warehousing	12,850	16.0	14,906

(cont'd.)

Table A-3 (cont'd.). Estimated Annual Wages and Labor Costs per Employee by Subsector:
Eddy and Lea Counties (1979)

IO Subsector	Estimated Annual Wages (1979)	Estimated Fringe Benefits (percent)	Estimated Annual Labor Costs per Employee (1979)
28. Communications	10,917	16.0	12,664
29. Electrical Utility	18,821	15.0	21,644
30. Gas Utility	18,821	15.0	21,644
31. Water & Sewer	10,536	16.0	12,222
32. Wholesale Trade	13,946	16.0	16,177
33. Retail Trade	7,751	17.0	9,069
34. F. I. R. E.**	11,068	16.0	12,839
35. Lodg. Person. & Repair Serv.	6,541	17.0	7,653
36. Business & Misc. Service	11,142	16.0	12,925
37. Medical & Non-Profit	9,049	16.0	10,497
52. Government	12,944	16.0	15,015

*No activity in this subsector in the two-county area.

**Finance, Insurance, and Real Estate

^aThese wages and labor costs are for those jobs supported in indirectly affected subsectors. Jobs created by (directly associated with) the construction and operation of the WIPP project have annual wages which are not included in the listed figures.

Source: 1979 average wage derived from "Covered Employment and Wages," Quarterly Report, New Mexico Employment Security, 1978. Wages were estimated for 1979 using an adjustment factor specific to major sectors.

Fringe benefits determined from interviews with private companies and unions. Minimum applicable percentages apply to most secondary and tertiary subsectors.

Per employee costs are representative of the annual wage and are not necessarily a 40-hour average week.

input-output table, inverted version, i.e., the direct, indirect, and induced effects (Table A-2) for that specific column in which the activity is taking place (41: aboveground construction--1983).

The process for determining the impact on indirectly affected economic subsectors is illustrated in the following equations:

$$I_{ij} \times AIMP_{1983} = \$IMP_{ij}$$

$$[0.01279 \times \$53,113,200 = \$679,318]$$

where

I_{ij} = coefficient from Table A-2 for row i and column entry j ; $i = 1, \dots, 52$ and $j = 1, \dots, 52$. Example uses $i = 28$ communications subsector and $j = 41$ aboveground construction in 1983, e.g., $I_{28,41} = 0.01279$.

$AIMP_{1983}$ = aboveground construction impact for 1983, i.e., \$53,113,200.

$\$IMP_{ij}$ = dollar indirect impact in subsector i due to exogenous increase in subsector j , i.e., impact on communications subsector due to an increase in aboveground construction activity.

From this calculation it is apparent that the model estimates that the increase in the communication subsector during 1983 will be about \$680,000.

The next step is to determine the amount of money in the communications subsector that will be expended for labor, i.e., labor costs. The following equation illustrates this:

$$\$IMP_{ij} \times LC_{54i} = \$LC_{ji}$$

$$[\$679,318 \times 0.39097 = \$265,593]$$

where

LC_{54i} = coefficient for labor costs in subsector i from Table A-1; $i = 1, \dots, 52$, e.g., $LC_{54,28} = 0.39097$ represents coefficient for labor cost in subsector $i = 28$ communications.

$\$LC_{ji}$ = dollars flowing to labor cost in subsector i due to an increase in activity in subsector j , i.e., total labor cost in communications $i = 28$ as an indirect result of an increase in aboveground construction $j = 41$ of \$53,113,200 in 1983.

After determining that just more than \$265,000 will flow into labor costs during 1983 through the communications subsector due to increased aboveground construction activity, the remaining step is to determine how many jobs this \$265,000 will support during 1983. This is accomplished by the following mathematical operation:

$\$LC_{ji}$ annual ULC_i = indirect job_{ji}

[\$265,593 \$12,664 = 21.0]

where

Annual ULC_i = annual average per unit labor cost in subsector i,
e.g., in subsector i = 28 communications annual
 ULC_i = \$12,664.

Indirect Job_{ji} = Number of jobs in subsector i supported by new
activity in subsector j, i.e., j = 41, aboveground
construction \$53,113,200 supports 21.0 jobs in i = 28
communications.

This example shows that the resulting impact on jobs in this subsector--communications--will be 21.0 jobs for 1983. Obviously the number of jobs supported indirectly by the WIPP project will vary from year to year. Tables A-4 through A-10 list the indirect effects of the WIPP for each year from 1980 through 1986, and for an average operations year thereafter. These tables list the estimated dollar volume flow into the indirect, private subsectors of the two-county economy, i.e., 38 subsectors (37 private and one government) and the number of jobs indirectly created in each one of these subsectors.

Table A-11 lists indirect employment impact by major sector (including government) and gives the employment multiplier associated with each year. Table A-12 gives the total number of direct, private indirect, and government jobs supported (created) by the WIPP project for the years 1980 through 1986 before the plant becomes fully operational.

A.4 POPULATION

Three critical areas of economic analysis must be analyzed in order to determine overall impact generated by an exogenous increase in a specific activity within a region--employment increases, increases in the flow of dollars including personal income, and population changes. The order in which these specific categories are computed is important to the methodology demonstrated in this appendix.

Changes in employment and increases in dollar flows can be derived directly from the results of the input-output model. Population migration, however, is dependent upon the increase in employment derived from the input-output model. While derivation of employment depends on assumptions concerning certain coefficients and factors drawn from previous studies, increases in population may be significantly influenced by changes in activity in other areas of the economy which cannot be predicted with reasonable accuracy. Specific conditions of uncertainty involve mining, which supports much of the economic activity within the two-county area.

Table A-4. Indirect Impact--Dollar Volume and Jobs Supported--by Subsector (1980)^a

SUBSECTOR	ABOVEGROUND OPERATION		MANAGEMENT & DESIGN		BELOWGROUND OPERATION	
	ESTIMATED VOLUME	JOBS SUPPORTED	ESTIMATED VOLUME	JOBS SUPPORTED	ESTIMATED VOLUME	JOBS SUPPORTED
1. LIVESTOCK & LIVESTOCK PROD.	0.2	0.0	2.0	0.0	11.2	0.0
2. COTTON	0.1	0.0	0.9	0.0	5.3	0.0
3. GRAINS & SEEDS	0.1	0.0	1.2	0.0	6.4	0.1
4. FRUITS & VEGETABLES	0.0	0.0	0.4	0.0	2.2	0.0
5. FORESTRY & FISHERY PRODUCTS	0.0	0.0	0.4	0.0	2.5	0.0
6. AGRICULTURAL SERVICES	0.1	0.0	0.3	0.0	2.4	0.1
7. MISC. METAL & OTHER MINERALS	0.0	0.0	0.0	0.0	0.0	0.0
8. CRUDE PETROLEUM	0.7	0.0	7.5	0.0	34.9	0.2
9. NAT. GAS & LIQUID PETROLEUM	0.2	0.0	2.6	0.0	11.9	0.1
10. STONE GRAVEL & SAND	1.3	0.0	0.1	0.0	17.5	0.3
11. POTASH MINING	0.0	0.0	0.0	0.0	0.1	0.0
12. RESIDENTIAL CONSTRUCTION*	0.0	0.0	0.0	0.0	0.0	0.0
13. NONRESIDENTIAL CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
14. ALL OTHER CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
15. CONSTRUCTION MAINTENANCE	0.5	0.0	7.9	0.3	24.3	0.9
16. FOOD PRODUCTS	0.9	0.0	8.6	0.1	49.3	0.6
17. FABRICS & APPAREL	0.0	0.0	0.2	0.0	1.3	0.0
18. WOOD & LUMBER PRODUCTS	0.0	0.0	0.2	0.0	0.8	0.0
19. PRINTING	0.2	0.0	2.1	0.0	9.6	0.2
20. CHEMICAL PRODUCTS	0.1	0.0	1.2	0.0	3.8	0.1
21. PLASTIC & PETROLEUM	1.5	0.0	15.7	0.1	73.1	0.3
22. GLASS & STONE PRODUCTS	0.1	0.0	0.1	0.0	1.4	0.0
23. PRIMARY METAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0
24. FABRICATED METAL PRODUCTS	0.2	0.0	0.0	0.0	3.3	0.1
25. MACHINERY	0.1	0.0	2.2	0.1	12.9	0.3
26. ELECTRICAL PRODUCTS	0.0	0.0	0.1	0.0	0.1	0.0
27. TRANSPORT. & WAREHOUSING	2.3	0.1	17.6	0.5	102.1	2.8
28. COMMUNICATIONS	1.8	0.1	18.6	0.6	57.3	1.8
29. ELECTRICAL UTILITY	1.4	0.0	12.9	0.1	123.9	0.8
30. GAS UTILITY	0.9	0.0	11.5	0.1	51.1	0.3
31. WATER & SEWER	0.3	0.0	3.3	0.0	14.2	0.2
32. WHOLESALE TRADE	14.8	0.4	35.1	0.9	629.6	16.5
33. RETAIL TRADE	8.3	0.4	89.5	4.2	444.1	20.8
34. F. I. R. E.**	5.6	0.2	59.8	1.7	228.2	6.4
35. LODG. PERSON. & REPAIR SERV.	3.8	0.2	41.4	1.9	191.6	8.7
36. BUSINESS & MISC. SERVICE	1.4	0.0	46.7	1.5	66.0	2.2
37. MEDICAL & NON-PROFIT	0.6	0.0	6.9	0.3	30.7	1.5
TOTAL INDIRECT IMPACT	47.9	1	396.8	13	2,213.1	65

Detail may not equal total due to rounding.

*A portion of construction impact is experienced in the F.I.R.E. subsector due to the procedures followed in building the national model by the Bureau of Economic Analysis, Department of Commerce. Exact impacts of the construction subsector portions cycled through the F.I.R.E. subsector are not available.

**Finance, Insurance, and Real Estate.

^aEntries for "Estimated Volume" are thousands of 1979 dollars.

Source: Larry Jacobson and Associates, 1979.

Table A-5. Indirect Impact--Dollar Volume and Jobs Supported--by Subsector (1981)^a

SUBSECTOR	ABOVEGROUND OPERATION		MANAGEMENT & DESIGN		BELOWGROUND OPERATION	
	ESTIMATED VOLUME	JOBS SUPPORTED	ESTIMATED VOLUME	JOBS SUPPORTED	ESTIMATED VOLUME	JOBS SUPPORTED
1. LIVESTOCK & LIVESTOCK PROD.	15.7	0.1	13.7	0.1	31.6	0.1
2. COTTON	7.4	0.1	6.4	0.1	15.1	0.1
3. GRAINS & SEEDS	10.5	0.1	8.1	0.1	18.1	0.2
4. FRUITS & VEGETABLES	3.0	0.0	2.8	0.0	6.4	0.1
5. FORESTRY & FISHERY PRODUCTS	3.4	0.1	3.1	0.1	7.1	0.1
6. AGRICULTURAL SERVICES	10.7	0.3	2.4	0.1	6.7	0.2
7. MISC. METAL & OTHER MINERALS	0.0	0.0	0.0	0.0	0.1	0.0
8. CRUDE PETROLEUM	57.2	0.3	51.3	0.3	98.1	0.6
9. NAT. GAS & LIQUID PETROLEUM	17.0	0.1	17.6	0.1	33.4	0.2
10. STONE GRAVEL & SAND	151.9	2.2	0.5	0.0	45.3	0.7
11. POTASH MINING	0.2	0.0	0.1	0.0	0.2	0.0
12. RESIDENTIAL CONSTRUCTION*	0.0	0.0	0.0	0.0	0.0	0.0
13. NONRESIDENTIAL CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
14. ALL OTHER CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
15. CONSTRUCTION MAINTENANCE	40.6	1.6	54.2	2.1	67.7	2.6
16. FOOD PRODUCTS	68.4	0.8	58.9	0.7	139.7	1.7
17. FABRICS & APPAREL	2.6	0.1	1.1	0.0	3.4	0.1
18. WOOD & LUMBER PRODUCTS	1.0	0.0	0.8	0.0	2.0	0.0
19. PRINTING	14.0	0.3	14.2	0.3	27.2	0.6
20. CHEMICAL PRODUCTS	6.9	0.1	8.6	0.2	10.7	0.2
21. PLASTIC & PETROLEUM	120.6	0.5	107.5	0.5	205.4	0.9
22. GLASS & STONE PRODUCTS	9.6	0.2	0.4	0.0	3.7	0.1
23. PRIMARY METAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0
24. FABRICATED METAL PRODUCTS	27.5	0.6	0.1	0.0	8.5	0.2
25. MACHINERY	9.2	0.2	15.1	0.4	34.1	0.8
26. ELECTRICAL PRODUCTS	0.2	0.0	0.5	0.0	0.3	0.0
27. TRANSPORT. & WAREHOUSING	211.5	5.8	121.0	3.3	279.5	7.6
28. COMMUNICATIONS	173.8	5.4	127.7	3.9	159.4	4.9
29. ELECTRICAL UTILITY	116.8	0.8	88.8	0.6	334.5	2.2
30. GAS UTILITY	69.1	0.4	78.7	0.5	143.7	0.9
31. WATER & SEWER	21.8	0.2	22.7	0.3	40.1	0.5
32. WHOLESALE TRADE	1,561.7	41.0	241.3	6.3	1,659.2	43.6
33. RETAIL TRADE	611.4	28.7	614.6	28.8	1,258.5	59.0
34. F.I.R.E.**	487.4	13.7	410.8	11.6	637.1	17.9
35. LODG. PERSON. & REPAIR SERV.	304.2	13.8	284.2	12.9	537.0	24.4
36. BUSINESS & MISC. SERVICE	124.0	4.0	320.5	10.5	183.1	6.0
37. MEDICAL & NON-PROFIT	44.0	2.2	47.3	2.3	86.8	4.3
TOTAL INDIRECT IMPACT	4,303.2	124	2,725.0	86	6,083.4	181

Detail may not equal total due to rounding.

*A portion of construction impact is experienced in the F.I.R.E. subsector due to the procedures followed in building the national model by the Bureau of Economic Analysis, Department of Commerce. Exact impacts of the construction subsector portions cycled through the F.I.R.E. subsector are not available.

**Finance, Insurance, and Real Estate.

^aEntries for "Estimated Volume" are thousands of 1979 dollars.

Source: Larry Adcock and Associates, 1979.

Table A-6. Indirect Impact--Dollar Volume and Jobs Supported--by Subsector (1982)^a

SUBSECTOR	ABOVEGROUND OPERATION		MANAGEMENT & DESIGN		BELOWGROUND OPERATION	
	ESTIMATED VOLUME	JOBS SUPPORTED	ESTIMATED VOLUME	JOBS SUPPORTED	ESTIMATED VOLUME	JOBS SUPPORTED
1. LIVESTOCK & LIVESTOCK PROD.	75.8	0.3	32.9	0.1	69.3	0.3
2. COTTON	35.9	0.3	15.3	0.1	33.1	0.3
3. GRAINS & SEEDS	47.3	0.4	19.3	0.2	39.6	0.3
4. FRUITS & VEGETABLES	15.0	0.1	6.6	0.1	14.0	0.1
5. FORESTRY & FISHERY PRODUCTS	16.7	0.3	7.4	0.1	15.5	0.3
6. AGRICULTURAL SERVICES	35.0	1.1	5.7	0.2	14.7	0.5
7. MISC. METAL & OTHER MINERALS	0.1	0.0	0.1	0.0	0.1	0.0
8. CRUDE PETROLEUM	251.8	1.4	123.4	0.7	215.1	1.2
9. NAT. GAS & LIQUID PETROLEUM	78.0	0.4	42.3	0.2	73.3	0.4
10. STONE GRAVEL & SAND	423.9	6.2	1.2	0.0	99.2	1.5
11. POTASH MINING	0.6	0.0	0.2	0.0	0.3	0.0
12. RESIDENTIAL CONSTRUCTION*	0.0	0.0	0.0	0.0	0.0	0.0
13. NONRESIDENTIAL CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
14. ALL OTHER CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
15. CONSTRUCTION MAINTENANCE	170.4	6.6	130.2	5.1	148.4	5.8
16. FOOD PRODUCTS	332.1	4.1	141.6	1.7	306.5	3.8
17. FABRICS & APPAREL	9.2	0.3	2.6	0.1	7.5	0.2
18. WOOD & LUMBER PRODUCTS	3.6	0.1	1.9	0.0	4.4	0.1
19. PRINTING	65.9	1.3	34.2	0.7	59.6	1.2
20. CHEMICAL PRODUCTS	28.5	0.5	20.5	0.4	23.5	0.4
21. PLASTIC & PETROLEUM	529.9	2.3	258.3	1.1	450.7	1.9
22. GLASS & STONE PRODUCTS	27.2	0.6	1.0	0.0	8.2	0.2
23. PRIMARY METAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0
24. FABRICATED METAL PRODUCTS	76.8	1.7	0.2	0.0	18.6	0.4
25. MACHINERY	34.9	0.8	36.3	0.9	74.8	1.8
26. ELECTRICAL PRODUCTS	0.8	0.0	1.3	0.0	0.7	0.0
27. TRANSPORT. & WAREHOUSING	774.3	21.1	290.8	7.9	612.9	16.7
28. COMMUNICATIONS	618.5	19.1	306.8	9.5	349.7	10.8
29. ELECTRICAL UTILITY	498.6	3.2	213.4	1.4	733.3	4.7
30. GAS UTILITY	329.9	2.1	189.2	1.2	315.3	2.0
31. WATER & SEWER	99.1	1.1	54.6	0.6	87.9	1.0
32. WHOLESALE TRADE	4,770.6	125.3	579.7	15.2	3,636.2	95.5
33. RETAIL TRADE	2,991.3	140.2	1,476.6	69.2	2,761.0	129.4
34. F.I.R.E.**	1,911.5	53.8	987.1	27.8	1,397.5	39.4
35. LODG. PERSON. & REPAIR SERV.	1,334.5	60.6	682.8	31.0	1,178.0	53.5
36. BUSINESS & MISC. SERVICE	491.9	16.0	769.9	25.1	401.6	13.1
37. MEDICAL & NON-PROFIT	208.9	10.2	113.6	5.6	190.4	9.3
TOTAL INDIRECT IMPACT	16,288.4	482	6,547.1	206	13,340.9	396

Detail may not equal total due to rounding.

*A portion of construction impact is experienced in the F.I.R.E. subsector due to the procedures followed in building the national model by the Bureau of Economic Analysis, Department of Commerce. Exact impacts of the construction subsector portions cycled through the F.I.R.E. subsector are not available.

**Finance, Insurance, and Real Estate.

^aEntries for "Estimated Volume" are thousands of 1979 dollars.

Source: Larry Adcock and Associates, 1979.

Table A-7. Indirect Impact--Dollar Volume and Jobs Supported--by Subsector (1983)^a

SUBSECTOR	ABOVEGROUND OPERATION		MANAGEMENT & DESIGN		BELOWGROUND OPERATION	
	ESTIMATED VOLUME	JOBS SUPPORTED	ESTIMATED VOLUME	JOBS SUPPORTED	ESTIMATED VOLUME	JOBS SUPPORTED
1. LIVESTOCK & LIVESTOCK PROD.	94.5	0.4	57.2	0.2	23.4	0.1
2. COTTON	44.7	0.4	26.6	0.2	11.2	0.1
3. GRAINS & SEEDS	57.5	0.5	33.7	0.3	13.4	0.1
4. FRUITS & VEGETABLES	18.9	0.2	11.5	0.1	4.7	0.0
5. FORESTRY & FISHERY PRODUCTS	21.0	0.4	12.8	0.2	5.2	0.1
6. AGRICULTURAL SERVICES	36.9	1.2	10.0	0.3	5.0	0.2
7. MISC. METAL & OTHER MINERALS	0.2	0.0	0.1	0.0	0.0	0.0
8. CRUDE PETROLEUM	303.6	1.7	214.8	1.2	72.8	0.4
9. NAT. GAS & LIQUID PETROLEUM	95.6	0.5	73.7	0.4	24.8	0.1
10. STONE GRAVEL & SAND	400.7	5.9	2.0	0.0	34.5	0.5
11. POTASH MINING	0.6	0.0	0.4	0.0	0.1	0.0
12. RESIDENTIAL CONSTRUCTION*	0.0	0.0	0.0	0.0	0.0	0.0
13. NONRESIDENTIAL CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
14. ALL OTHER CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
15. CONSTRUCTION MAINTENANCE	201.6	7.8	226.6	8.8	50.4	2.0
16. FOOD PRODUCTS	414.3	5.1	246.5	3.0	103.5	1.3
17. FABRICS & APPAREL	10.1	0.3	4.6	0.2	2.6	0.1
18. WOOD & LUMBER PRODUCTS	3.9	0.1	3.4	0.1	1.5	0.0
19. PRINTING	81.5	1.7	59.5	1.2	20.1	0.4
20. CHEMICAL PRODUCTS	33.5	0.6	35.8	0.6	8.0	0.1
21. PLASTIC & PETROLEUM	638.4	2.7	449.8	1.9	152.5	0.6
22. GLASS & STONE PRODUCTS	26.1	0.6	1.8	0.0	2.8	0.1
23. PRIMARY METAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0
24. FABRICATED METAL PRODUCTS	72.6	1.6	0.4	0.0	6.5	0.1
25. MACHINERY	39.6	1.0	63.1	1.5	25.8	0.6
26. ELECTRICAL PRODUCTS	0.9	0.0	2.2	0.1	0.2	0.0
27. TRANSPORT. & WAREHOUSING	862.7	23.5	506.4	13.8	209.2	5.7
28. COMMUNICATIONS	679.6	21.0	534.3	16.5	118.7	3.7
29. ELECTRICAL UTILITY	594.0	3.8	371.6	2.4	251.4	1.6
30. GAS UTILITY	409.2	2.6	329.4	2.1	106.7	0.7
31. WATER & SEWER	120.7	1.4	95.1	1.1	29.7	0.3
32. WHOLESALE TRADE	4,802.9	126.2	1,009.4	26.5	1,256.8	33.0
33. RETAIL TRADE	3,740.6	175.3	2,571.2	120.5	931.9	43.7
34. F.I.R.E.**	2,198.7	61.9	1,718.7	48.4	473.9	13.3
35. LODG. PERSON. & REPAIR SERV.	1,606.5	73.0	1,188.8	54.0	399.0	18.1
36. BUSINESS & MISC. SERVICE	568.6	18.5	1,340.6	43.7	136.5	4.5
37. MEDICAL & NON-PROFIT	258.6	12.7	197.7	9.7	64.3	3.2
TOTAL INDIRECT IMPACT	18,438.5	553	11,399.9	359	4,547.2	135

Detail may not equal total due to rounding.

*A portion of construction impact is experienced in the F.I.R.E. subsector due to the procedures followed in building the national model by the Bureau of Economic Analysis, Department of Commerce. Exact impacts of the construction subsector portions cycled through the F.I.R.E. subsector are not available.

**Finance, Insurance, and Real Estate.

^aEntries for "Estimated Volume" are thousands of 1979 dollars.

Source: Larry Adcock and Associates, 1979.

Table A-8. Indirect Impact--Dollar Volume and Jobs Supported--by Subsector (1984)^a

SUBSECTOR	ABOVEGROUND OPERATION		MANAGEMENT & DESIGN		BELOWGROUND OPERATION	
	ESTIMATED VOLUME	JOB SUPPORTED	ESTIMATED VOLUME	JOB SUPPORTED	ESTIMATED VOLUME	JOB SUPPORTED
1. LIVESTOCK & LIVESTOCK PROD.	13.9	0.1	40.5	0.2	1.6	0.0
2. COTTON	6.6	0.1	18.8	0.2	0.8	0.0
3. GRAINS & SEEDS	8.5	0.1	23.8	0.2	0.9	0.0
4. FRUITS & VEGETABLES	2.8	0.0	8.2	0.1	0.3	0.0
5. FORESTRY & FISHERY PRODUCTS	3.1	0.1	9.1	0.2	0.4	0.0
6. AGRICULTURAL SERVICES	5.8	0.2	7.1	0.2	0.4	0.0
7. MISC. METAL & OTHER MINERALS	0.0	0.0	0.1	0.0	0.0	0.0
8. CRUDE PETROLEUM	45.1	0.3	151.8	0.9	5.1	0.0
9. NAT. GAS & LIQUID PETROLEUM	14.1	0.1	52.1	0.3	1.8	0.0
10. STONE GRAVEL & SAND	65.5	1.0	1.4	0.0	2.6	0.0
11. POTASH MINING	0.1	0.0	0.3	0.0	0.0	0.0
12. RESIDENTIAL CONSTRUCTION*	0.0	0.0	0.0	0.0	0.0	0.0
13. NONRESIDENTIAL CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
14. ALL OTHER CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
15. CONSTRUCTION MAINTENANCE	30.1	1.2	160.2	6.2	3.6	0.1
16. FOOD PRODUCTS	60.8	0.7	174.3	2.1	7.3	0.1
17. FABRICS & APPAREL	1.5	0.1	3.3	0.1	0.2	0.0
18. WOOD & LUMBER PRODUCTS	0.6	0.0	2.4	0.1	0.1	0.0
19. PRINTING	12.0	0.2	42.1	0.9	1.4	0.0
20. CHEMICAL PRODUCTS	5.0	0.1	25.3	0.5	0.6	0.0
21. PLASTIC & PETROLEUM	94.8	0.4	318.0	1.4	10.8	0.0
22. GLASS & STONE PRODUCTS	4.2	0.1	1.2	0.0	0.2	0.0
23. PRIMARY METAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0
24. FABRICATED METAL PRODUCTS	11.9	0.3	0.2	0.0	0.5	0.0
25. MACHINERY	6.0	0.1	44.6	1.1	1.9	0.0
26. ELECTRICAL PRODUCTS	0.1	0.0	1.6	0.0	0.0	0.0
27. TRANSPORT. & WAREHOUSING	131.9	3.6	357.9	9.8	15.1	0.4
28. COMMUNICATIONS	104.5	3.2	377.7	11.7	8.5	0.3
29. ELECTRICAL UTILITY	88.6	0.6	262.7	1.7	18.4	0.1
30. GAS UTILITY	60.1	0.4	232.9	1.5	7.5	0.0
31. WATER & SEWER	17.9	0.2	67.2	0.8	2.1	0.0
32. WHOLESALE TRADE	764.7	20.1	713.5	18.7	93.7	2.5
33. RETAIL TRADE	548.1	25.7	1,817.4	85.2	65.5	3.1
34. F.I.R.E.**	332.2	9.4	1,214.8	34.2	33.7	0.9
35. LODG. PERSON. & REPAIR SERV.	238.7	10.8	840.3	38.2	28.3	1.3
36. BUSINESS & MISC. SERVICE	85.8	2.8	947.6	30.9	9.8	0.3
37. MEDICAL & NON-PROFIT	38.0	1.9	139.8	6.9	4.5	0.2
TOTAL INDIRECT IMPACT	2,803.0	84	8,057.8	254	327.6	10

Detail may not equal total due to rounding.

*A portion of construction impact is experienced in the F.I.R.E. subsector due to the procedures followed in building the national model by the Bureau of Economic Analysis, Department of Commerce. Exact impacts of the construction subsector portions cycled through the F.I.R.E. subsector are not available.

**Finance, Insurance, and Real Estate.

^aEntries for "Estimated Volume" are thousands of 1979 dollars.

Source: Larry Adcock and Associates, 1979.

Table A-9. Indirect Impact--Dollar Volume and Jobs Supported--
By Subsector (1985 and 1986)^a

SUBSECTOR	1985		1986	
	MANAGEMENT AND DESIGN ESTIMATED VOLUME	JOBS SUPPORTED	MANAGEMENT AND DESIGN ESTIMATED VOLUME	JOBS SUPPORTED
1. LIVESTOCK & LIVESTOCK PROD.	49.2	0.2	68.7	0.3
2. COTTON	22.9	0.2	31.9	0.3
3. GRAINS & SEEDS	29.0	0.3	40.5	0.4
4. FRUITS & VEGETABLES	9.9	0.1	13.9	0.1
5. FORESTRY & FISHERY PRODUCTS	11.0	0.2	15.4	0.3
6. AGRICULTURAL SERVICES	8.6	0.3	12.0	0.4
7. MISC. METAL & OTHER MINERALS	0.1	0.0	0.1	0.0
8. CRUDE PETROLEUM	184.8	1.0	258.0	1.5
9. NAT. GAS & LIQUID PETROLEUM	63.4	0.4	88.5	0.5
10. STONE GRAVEL & SAND	1.7	0.0	2.4	0.0
11. POTASH MINING	0.3	0.0	0.4	0.0
12. RESIDENTIAL CONSTRUCTION*	0.0	0.0	0.0	0.0
13. NONRESIDENTIAL CONSTRUCTION	0.0	0.0	0.0	0.0
14. ALL OTHER CONSTRUCTION	0.0	0.0	0.0	0.0
15. CONSTRUCTION MAINTENANCE	194.9	7.6	272.2	10.6
16. FOOD PRODUCTS	212.1	2.6	296.1	3.6
17. FABRICS & APPAREL	4.0	0.1	5.5	0.2
18. WOOD & LUMBER PRODUCTS	2.9	0.1	4.0	0.1
19. PRINTING	51.2	1.0	71.5	1.5
20. CHEMICAL PRODUCTS	30.8	0.6	43.0	0.8
21. PLASTIC & PETROLEUM	386.9	1.6	540.3	2.3
22. GLASS & STONE PRODUCTS	1.5	0.0	2.1	0.0
23. PRIMARY METAL PRODUCTS	0.0	0.0	0.0	0.0
24. FABRICATED METAL PRODUCTS	0.3	0.0	0.4	0.0
25. MACHINERY	54.3	1.3	75.8	1.8
26. ELECTRICAL PRODUCTS	1.9	0.1	2.7	0.1
27. TRANSPORT. & WAREHOUSING	435.6	11.9	608.2	16.6
28. COMMUNICATIONS	459.6	14.2	641.7	19.8
29. ELECTRICAL UTILITY	319.7	2.1	446.4	2.9
30. GAS UTILITY	283.4	1.8	395.7	2.6
31. WATER & SEWER	81.8	0.9	114.2	1.3
32. WHOLESALE TRADE	868.2	22.8	1,212.3	31.8
33. RETAIL TRADE	2,211.6	103.6	3,088.0	144.7
34. F. I. R. E.**	1,478.3	41.6	2,064.2	58.1
35. LODG. PERSON. & REPAIR SERV.	1,022.6	46.4	1,427.8	64.9
36. BUSINESS & MISC. SERVICE	1,153.1	37.6	1,610.1	52.5
37. MEDICAL & NON-PROFIT	170.1	8.3	237.5	11.6
TOTAL INDIRECT IMPACT	9,805.6	309	13,691.7	432

Detail may not equal total due to rounding.

*A portion of construction impact is experienced in the F.I.R.E. subsector due to the procedures followed in building the national model by the Bureau of Economic Analysis, Department of Commerce. Exact impacts of the construction subsector portions cycled through the F.I.R.E. subsector are not available.

**Finance, Insurance, and Real Estate.

^aEntries for "Estimated Volume" are thousands of 1979 dollars.

Source: Larry Adcock and Associates, 1979.

Table A-10. Indirect Impact--Dollar Volume and Jobs Supported--by Subsector
(Average Year, 1987 and Thereafter)^a

SUBSECTOR	ABOVEGROUND OPERATION		MANAGEMENT & DESIGN		BELOWGROUND OPERATION	
	ESTIMATED VOLUME	JOBS SUPPORTED	ESTIMATED VOLUME	JOBS SUPPORTED	ESTIMATED VOLUME	JOBS SUPPORTED
1. LIVESTOCK & LIVESTOCK PROD.	47.3	0.2	9.0	0.0	22.0	0.1
2. COTTON	22.0	0.2	4.0	0.0	10.4	0.1
3. GRAINS & SEEDS	27.8	0.2	8.6	0.1	12.5	0.1
4. FRUITS & VEGETABLES	9.6	0.1	1.7	0.0	4.5	0.0
5. FORESTRY & FISHERY PRODUCTS	10.6	0.2	2.0	0.0	5.0	0.1
6. AGRICULTURAL SERVICES	8.2	0.3	1.6	0.1	3.7	0.1
7. MISC. METAL & OTHER MINERALS	0.1	0.0	0.1	0.0	0.0	0.0
8. CRUDE PETROLEUM	175.5	1.0	65.3	0.4	69.4	0.4
9. NAT. GAS & LIQUID PETROLEUM	60.1	0.3	26.0	0.1	26.8	0.2
10. STONE GRAVEL & SAND	1.6	0.0	0.6	0.0	0.6	0.0
11. POTASH MINING	0.3	0.0	0.0	0.0	0.1	0.0
12. RESIDENTIAL CONSTRUCTION*	0.0	0.0	0.0	0.0	0.0	0.0
13. NONRESIDENTIAL CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
14. ALL OTHER CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.0
15. CONSTRUCTION MAINTENANCE	181.7	7.1	74.6	2.9	69.3	2.7
16. FOOD PRODUCTS	204.1	2.5	36.4	0.4	96.3	1.2
17. FABRICS & APPAREL	3.8	0.1	1.8	0.1	1.6	0.1
18. WOOD & LUMBER PRODUCTS	2.7	0.1	0.5	0.0	4.5	0.1
19. PRINTING	48.7	1.0	8.2	0.2	18.7	0.4
20. CHEMICAL PRODUCTS	28.7	0.5	3.9	0.1	7.0	0.1
21. PLASTIC & PETROLEUM	367.5	1.6	135.7	0.6	144.3	0.6
22. GLASS & STONE PRODUCTS	1.4	0.0	0.4	0.0	0.5	0.0
23. PRIMARY METAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0
24. FABRICATED METAL PRODUCTS	0.3	0.0	0.0	0.0	0.1	0.0
25. MACHINERY	50.1	1.2	3.3	0.1	123.3	3.0
26. ELECTRICAL PRODUCTS	1.7	0.0	0.1	0.0	0.3	0.0
27. TRANSPORT. & WAREHOUSING	410.7	11.2	282.1	7.7	218.9	6.0
28. COMMUNICATIONS	428.4	13.2	60.4	1.9	115.1	3.6
29. ELECTRICAL UTILITY	304.4	2.0	93.4	0.6	481.9	3.1
30. GAS UTILITY	268.5	1.7	54.2	0.4	114.1	0.7
31. WATER & SEWER	77.4	0.9	13.8	0.2	27.1	0.3
32. WHOLESALE TRADE	822.6	21.6	176.1	4.6	316.8	8.3
33. RETAIL TRADE	2,133.0	99.0	363.3	17.0	891.4	41.8
34. F.I.R.E.**	1,387.7	39.1	210.3	5.9	443.5	12.5
35. LODG. PERSON. & REPAIR SERV.	968.3	44.0	193.9	8.8	342.2	15.5
36. BUSINESS & MISC. SERVICE	1,059.4	34.6	72.5	2.4	109.4	3.6
37. MEDICAL & NON-PROFIT	161.5	7.9	24.2	1.2	68.3	3.4
TOTAL INDIRECT IMPACT	9,225.6	292	1,927.8	56	3,749.5	108

Detail may not equal total due to rounding.

*A portion of construction impact is experienced in the F.I.R.E. subsector due to the procedures followed in building the national model by the Bureau of Economic Analysis, Department of Commerce. Exact impacts of the construction subsector portions cycled through the F.I.R.E. subsector are not available.

**Finance, Insurance, and Real Estate.

^aEntries for "Estimated Volume" are thousands of 1979 dollars.

Source: Larry Adcock and Associates, 1979.

Table A-11. Indirect Impact--Dollar Volume and Jobs Supported--by Major Sector
(1980 - 1987 and Thereafter)^a

Major Sector	Total 1980		Total 1981		Total 1982		Total 1983	
	Estimated Volume	Jobs Supported	Estimated Volume	Jobs Supported	Estimated Volume	Jobs Supported	Estimated Volume	Jobs Supported
Agriculture	35.9	0.3	171.8	1.8	499.2	5.2	488.3	5.0
Mining	76.8	0.6	472.9	4.4	1,309.6	12.0	1,223.9	10.9
Construction*	32.7	1.2	162.5	6.3	449.0	17.5	478.6	18.6
Manufacturing	189.0	2.0	902.3	9.6	2,561.3	26.8	2,511.3	25.7
Transportation, Communication & Utilities	419.2	7.2	1,989.3	37.3	5,474.4	102.6	5,218.9	100.3
Trade	1,221.3	43.3	5,946.7	207.4	16,215.4	574.8	14,312.8	525.2
F.I.R.E.**	293.6	8.3	1,535.3	43.2	4,296.0	121.0	4,391.3	123.6
Services	389.1	16.3	1,931.0	80.3	5,371.5	224.5	5,760.7	237.3
SUBTOTAL (Private Sector)	2,657.6	79.2	13,111.8	390.3	36,176.4	1,084.4	34,385.8	1,046.6
Government	324.9	9.8	1,479.7	44.6	4,325.6	130.5	4,281.7	129.1
TOTAL	2,982.5	89.0	14,591.5	434.9	40,502.0	1,214.9	38,677.3	1,175.7
Employment Multi- plier (additive)	1.44		1.54		1.32		1.24	

(cont'd.)

Table A-11 (cont'd.). Indirect Impact--Dollar Volume and Jobs Supported--by Major Sector
(1980 - 1987 and Thereafter)

Major Sector	Total 1984		Total 1985		Total 1986		Total 1987 & each year thereafter	
	Estimated Volume	Jobs Supported	Estimated Volume	Jobs Supported	Estimated Volume	Jobs Supported	Estimated Volume	Jobs Supported
Agriculture	152.3	1.5	130.7	1.2	182.4	1.7	210.4	1.9
Mining	340.0	2.6	250.3	1.4	349.5	2.0	426.5	2.5
Construction*	193.9	7.5	194.9	7.6	272.2	10.6	325.6	12.7
Manufacturing	832.9	8.3	745.8	7.4	1,041.4	10.4	1,295.5	14.0
Transportation, Communication & Utilities	1,753.0	34.3	1,580.0	30.9	2,206.2	43.1	2,950.3	53.4
Trade	4,002.8	155.2	3,079.8	126.5	4,300.4	176.6	4,683.4	192.4
F.I.R.E.**	1,580.7	44.5	1,478.3	41.6	2,064.2	58.1	2,041.5	57.5
Services	2,332.8	93.1	2,345.8	92.4	3,275.4	129.0	2,999.7	121.4
SUBTOTAL (Private Sector)	11,188.4	347.1	9,805.6	309.0	13,691.7	431.5	14,932.9	455.8
Government	1,387.1	41.9	1,232.7	37.2	1,721.2	51.9	1,931.8	58.3
TOTAL	12,575.5	389.0	11,038.3	346.2	15,412.9	483.4	16,864.7	514.1
Employment Multi- plier (additive)	1.31		1.29		1.16		1.17	

Detail may not equal total due to rounding.

*A portion of construction impact is experienced in the F.I.R.E. sector due to the procedures followed in building the national model by the Bureau of Economic Analysis, Department of Commerce. Exact impact of the Construction sector portion cycled through the F.I.R.E. sector is not available.

**Finance, Insurance, and Real Estate.

^aEntries for Estimated Volume are thousands of 1979 dollars.

Source: Larry Adcock and Associates, 1979.

Table A-12. Jobs Created and/or Supported by the Construction and Operation of the WIPP
(1980 Through 1987 and Thereafter)

Activity	1980	1981	1982	1983	1984	1985	1986	1987	After 1987
ABOVEGROUND CONSTRUCTION									
Direct jobs	1	68	415	551	79	---	---	---	---
Private, indirect jobs	<2	124	482	553	84	---	---	---	---
Government jobs	<1	11	55	69	10	---	---	---	---
Total jobs	3	203	952	1173	173	---	---	---	---
Annual new jobs	3	200	749	221	(1000)	(173)	---	---	---
*MANAGEMENT AND DESIGN									
Direct jobs	5	52	152	281	208	269	417	---	---
Private, indirect jobs	13	86	206	359	254	309	432	---	---
Government jobs	1	10	25	43	31	37	52	---	---
Total jobs	19	148	383	684	493	615	901	---	---
Annual new jobs	19	129	235	301	(191)	122	286	(901)	---
BELOWGROUND CONSTRUCTION									
Direct jobs	56	162	355	119	9	---	---	---	---
Private, indirect jobs	66	181	396	135	10	---	---	---	---
Government jobs	8	23	51	17	1	---	---	---	---
Total jobs	130	366	802	271	20	---	---	---	---
Annual new jobs	130	236	436	(531)	(251)	(20)	---	---	---
*OPERATION ABOVE GROUND(GENERAL)									
Direct jobs	---	---	---	---	*	*	*	256	256
Private, indirect jobs	---	---	---	---	*	*	*	292	292
Government jobs	---	---	---	---	*	*	*	36	36
Total jobs	---	---	---	---	*	*	*	584	584
Annual new jobs	---	---	---	---	*	*	*	584	---
*OPERATION REMOTE STORAGE AND SECURITY									
Direct jobs	---	---	---	---	*	*	*	44	44
Private, indirect jobs	---	---	---	---	*	*	*	56	56
Government jobs	---	---	---	---	*	*	*	6	6
Total jobs	---	---	---	---	*	*	*	106	106
Annual new jobs	---	---	---	---	*	*	*	106	---
*OPERATION BELOW GROUND									
Direct jobs	---	---	---	---	*	*	*	140	140
Private, indirect jobs	---	---	---	---	*	*	*	108	108
Government jobs	---	---	---	---	*	*	*	16	16
Total jobs	---	---	---	---	*	*	*	264	264
Annual new jobs	---	---	---	---	*	*	*	264	---
TOTAL ALL ACTIVITIES									
Direct jobs	62	282	922	951	296	269	417	440	440
Private, indirect jobs	81	391	1084	1047	348	309	432	456	456
Government jobs	10	44	131	129	42	37	52	58	58
Total jobs	152	717	2137	2128	686	615	901	954	954
Annual new jobs	152	565	4274	(9)	(1442)	(71)	286	53	---

Detail may not equal total due to rounding.

*The years 1984-1986 are transition years and some jobs listed as management and design will continue into operation positions.

Parentheses indicate negative amounts.

Recent examples of fluctuation in economic activity that make it difficult to determine exact population migration figures are evident. Between 1960 and 1970 both Eddy and Lea Counties lost population principally because of decreased levels of activity in the mining sector. The population of Eddy County during the 10-year period decreased 19% while the population loss in Lea County was just more than 7%. Before this decreasing trend was recognized, in the mid- and early 1960s, population projections produced by the Bureau of Business and Economic Research (BBER), the official state population projecting agency, were relatively high, indicating that professional demographic researchers felt that the area would continue to grow. Later population projections by the federal government and the BBER indicated somewhat lower levels of population growth. Since 1970 and particularly since the energy crisis, both counties have maintained high levels of growth. Growth in Eddy County is correlated with the cessation of potash "dumping" on the U.S. market by Canadian firms. In Lea County higher levels of oil and gas exploration and continued production have increased the population.

While the current outlook--particularly during the last 5 or 6 years--has been one of high expectations in terms of population growth in the near future, such population growth is influenced by a number of outside factors. For example, high prices and limited supplies within the petroleum industry have indirectly created growth in Lea County and in the city of Hobbs. Should the situation with the petroleum industry change, then the degree of growth could also change within the area. In terms of growth within Eddy County the potash industry (the major basic industry) now supplies about 90% of all potash sold in U.S. markets. Should the demand for potash decrease, then the activity in the mining sector within Eddy County would be significantly affected.

Personal interviews with the industrial development executives for Hobbs and Carlsbad indicate that a determined effort is under way to diversify the economy of both counties in order to stabilize their economic bases. Because of the high level of activity in the extractive industries, the availability of labor to fill certain occupations within Eddy and Lea Counties may dictate that a number of laborers will have to move into the area. However, recent developments while this study was being conducted tend to indicate that there is a (reasonable) labor supply for many of the (needed) occupations within the area.

Employment applicant records from the NMESD were examined to determine labor availability for various occupations. From this examination the percentage of individuals needed for those occupations directly connected with the construction and operation of the WIPP was determined. Economic activity within an area can change rather rapidly. As the level of economic activity changes, available labor in certain occupations also changes. Migration of individuals to fill positions for a large construction project or to operate a facility such as the WIPP depends on many factors. These include the recruitment procedure for employees, the availability of labor within an area, the construction company subcontracting practices, availability of community facilities, etc.

Many of the major factors affecting immigration can be recognized, but dealing with them in a quantitative manner becomes much more difficult. Researchers tend to rely on previous studies conducted to determine the degree of migration and/or specific analogous case studies of construction projects. Possibly one of the best studies to be produced in recent years is a study entitled Construction Worker Profile, completed for the Old West Regional Commission in early 1976. A large number of the migration factors contained in this appendix have been drawn from this document. However, for the determination of those individuals who are expected to move into the area to the jobs in secondary and tertiary sectors, i.e., spinoff jobs from the construction and operation of the power plant, there is very little information available. These facts should be recognized while reading this appendix.

A.4.1 Population Impact Calculations

In order to determine the extent of impact on population brought about by the construction and operation of the WIPP, calculations are made based on results of the employment portion of this technical procedure. The calculations for each year are too extensive to give here. However, sample calculations and formulas are given below that illustrate the procedure for determining the annual population impact. For illustrative purposes only, the year 1981, the second year of construction, and the year 1987, the first full year of operation, have been used in the sample calculations.

Calculations are made in three major parts. The first part of the calculation is the consideration of the population that is expected to move into the area due to the construction activity of the WIPP. The formulas are as follows:

$$AGC_{1981} \times MigCON_A = AGCJM_{1981}$$

$$[68 \times 0.539 = 37]$$

$$BGC_{1981} \times MigCON_B = BGCJM_{1981}$$

$$[162 \times 0.606 = 98]$$

$$MDE_{1981} \times MigCON_N = MDEJM_{1981}$$

$$[52 \times 0.498 = 26]$$

$$AGCJM_{1981} + BGCJM_{1981} = CJM_{1981}$$

$$[37 + 98 = 135]$$

$$MDEJM_{1981} = MOWH_{1981}$$

$$[26 = 26]$$

$$CJM_{1981} \times HCWF = MCWH_{1981}$$

$$[135 \times 0.985 = 133]$$

$$MCWH_{1981} \times CWHSZ = MCP_{1981}$$

$$[133 \times 2.28 = 303]$$

$$MOWH_{1981} \times OWHSZ_{1981} = MOP_{1981}$$

$$[26 \times 2.75 = 72]$$

$$MCP_{1981} + MOP_{1981} = MDP_{1981}$$

$$[303 + 72 = 375]$$

where

AGC₁₉₈₁ = the total number of WIPP-associated aboveground construction jobs in 1981;

BGC₁₉₈₁ = the total number of WIPP-associated belowground construction jobs in 1981;

MDE₁₉₈₁ = the total number of WIPP-associated management and design employment jobs in 1981;

MigCON_A = the proportion of total aboveground construction jobs expected to be filled by newcomers to the area. The factor 0.539 was derived from Construction Worker Profile figures for the Four Corners Region in 1975 (Arizona, Colorado, New Mexico, and Utah);

MigCON_B = the proportion of total belowground construction jobs expected to be filled by newcomers to the area. The factor 0.606 was determined by matching needed occupations and skill levels to present availability (first quarter of 1977 and third quarter of 1978 and 1979) of labor;

MigCON_N = the proportion of total nonconstruction employment jobs expected to be filled by newcomers to the area. The factor 0.498 is the weighted average of the final operational migration factors;

JM₁₉₈₁ = the total number of jobs expected to be filled by newcomers to the area; AGCJM = aboveground construction JM; BGCJM = belowground construction JM; MDE = management and design JM; CJM = construction JM;

HCWF = the factor that accounts for more than one construction worker per household (0.985);

MCWH₁₉₈₁ = the number of expected newcomer construction worker households to the area in 1981;

- MOWH₁₉₈₁ = the number of newcomer management and design worker households in 1981;
- CWHSZ = the average size of newcomer construction worker households (2.28--Construction Worker Profile);
- OWHSZ₁₉₈₁ = the average size of newcomer nonconstruction worker households in 1981 (see page A-48);
- MCP₁₉₈₁ = the expected number of individuals migrating directly due to jobs in construction of the WIPP in 1981.
- MOP₁₉₈₁ = the expected number of individuals migrating directly due to management and design jobs of the WIPP in 1981; and
- MDP₁₉₈₁ = the expected number of individuals immigrating due directly to jobs at the WIPP in 1981.

The sources of data are extremely important in computing the population immigrating to take new jobs for construction and operation of the WIPP. The average number of employees by year for construction or operation was derived from data supplied by the Bechtel Corporation (October 23, 1979) and Westinghouse Electric Corporation (November 1978). The proportion of new jobs expected to be filled by newcomers to the area is derived from the Old West Regional Commission (OWRC) study entitled Construction Worker Profile. That study involved 14 large construction projects (six projects in the Four Corners Region) and showed that the percentage of local workers varied from a high of more than 79% to a low of 3.3% for all projects and a high of 79% to a low of 32% for the 6 projects in the southwest (Arizona, Colorado, New Mexico and Utah). The average percentage of local workers employed on the southwest projects was 46.1%, indicating that 53.9% of the construction workers were not residents of the area before the construction activity (Four Corners Region only). A review of job applicants on computer files of the NMESD supports this distribution. Thus, approximately 54% of the construction workers for these six projects had migrated to the area for construction work. This percentage has been used to compute the number of aboveground jobs that would be filled by individuals not in the area before the construction activity began.

As construction workers move into the area to fill these positions, they bring with them other members of their households. Certain of these members--the older children and spouse--may take up jobs in the construction site area. The OWRC study indicates that about 1.5% of the new households contain two construction workers. This means that 985 households will supply 1,000 construction workers to the project, on the average. Thus, the number of needed households has been decreased by 1.5% to account for the two-construction-worker households. This factor of 0.985 is identified in the formula above as HCWF. The final formula above yields the total number of individuals immigrating to take new construction jobs. This number is computed by taking the average household size and multiplying it by the needed number of households to fill construction positions. In this case the average household size of 2.28 is the average household size determined from the OWRC study of all 14

construction projects through the West and Southwest. (For the explanation of the nonconstruction employment immigration see the section below on operation-associated immigrations.)

Having completed the calculations to determine the population immigration due directly to construction activity, the change due to operation must be computed. This is determined in the same way and is given by the following formulas:

(Note: The example year is 1987 because full operational impact does not occur before 1987.)

$$OAG_{1987} \times MigOPP_{AG} = OAGJM_{1987}$$

$$[256 \times 0.498 = 127]$$

$$OBG_{1987} \times MigOPP_{BG} = OBGJM_{1987}$$

$$[140 \times 0.498 = 70]$$

$$OST_{1987} \times MigOPP_{OST} = OSTJM_{1987}$$

$$[44 \times 0.498 = 22]$$

$$OAGJM_{1987} + OBGJM_{1987} + OCNJM_{1987} = OJM_{1987}$$

$$[127 + 70 + 22 = 219]$$

$$OJM_{1987} = MOWH_{1987}$$

$$[219 = 219]$$

$$MOWH_{1987} \times AVHSZ_{1987} = MOP_{1987}$$

$$[219 \times 2.71 = 594 \approx 600]$$

where

OAG_{1987} = the total number of WIPP-associated operation-aboveground jobs in 1987;

OBG_{1987} = the total number of WIPP-associated operation-belowground jobs in 1987;

OST_{1987} = the total number of WIPP-associated operation-storage jobs in 1987;

$MigOPP_{AG}$ = the proportion of total operation-aboveground jobs expected to be filled by newcomers to the area. The factor 0.498 was determined from occupation and skill level data supplied by Sandia, a review of available occupations and skills within the two-county area, and information supplied by Westinghouse Electric Corporation;

- MigOPP_{BG} = the proportion of total belowground operation jobs to be filled by newcomers to the area. The factor of 0.498 is the same factor that was used in the general operations aboveground projections;
- MigOPP_{OST} = the proportion of total operation-storage jobs to be filled by newcomers to the area. The factor of 0.498 is the same factor used for other operations jobs;
- JM₁₉₈₇ = the number of total operational jobs expected to be filled by newcomers to the area; OAGJM = operation-aboveground JM, OBGJM = operation-belowground JM, OSTJM = operation-remote handling and security; JM, OJM = total;
- MOWH₁₉₈₇ = the number of newcomer operational worker households in 1987;
- AVHSZ₁₉₈₇ = the average size household for the immigrating operational workers; and
- MOP₁₉₈₇ = the immigrating population due directly to operational jobs connected with the WIPP project.

Again, sources of information for the formulas above are extremely important. The direct operational employment is determined from information supplied by Westinghouse. The proportion of operational jobs to be filled by newcomers to the area is determined to be 0.498. Literature searches indicate no directly applicable research projects which would give the average number of operational jobs filled by newcomers to the area. In order to determine this factor, NMESD job applicant records, currently available occupational skill levels, and needed occupations and skill levels for the operation phase have been reviewed. Also, information regarding activities of operating contractors has been obtained from Westinghouse Electric Corporation.

The average size household figures for newcomers have been drawn directly from the Bureau of the Census publications of projected household sizes and family sizes. The figures used within the calculations represent Series I population figures and Series D household sizes. These are the high-range household sizes of the twelve projections listed by the Bureau of the Census in Current Population Reports, Series P-25, No. 805, May 1979.

The final set of calculations needed to determine the overall population migration is that of population taking jobs generated indirectly by the construction and operational activities of the WIPP. These population changes are computed in a very similar manner to the previous calculation, with one major exception. Construction workers and operational workers who have moved into the area bring with them other household members. Certain of these household members take up employment in other areas of the economy. These people must be accounted for in determining the overall migration of individuals to the area. Thus, the following formulas differ somewhat from the previous calculations:

$$IDE_{1981} \times MigID = IDJM_{1981}$$

$$[435 \times 0.50 = 218]$$

$$IDJM_{1981} - ADCE_{1981} - ADOE_{1981} = Net\ IDJM_{1981}$$

$$[218 - 26 - 8 = 184]$$

$$Net\ IDJM_{1981} \times HWF = MIDWH_{1981}$$

$$[184 \times 0.769 = 141]$$

$$MIDWH_{1981} \times AVHSZ_{1981} = MIDP_{1981}$$

$$[141 \times 2.75 = 388]$$

where

IDE_{1981} = the number of new indirect jobs (private and government) supported by construction or operational activity of the WIPP (example year is 1981);

$MigID$ = the proportion of indirect jobs to be filled by newcomers to the area (0.50);

$IDJM_{1981}$ = the number of indirect jobs in 1981 to be filled by newcomers to the area;

$ADCE_{1981}$ = the expected number of indirect jobs in 1981 filled by members of the construction workers' households moving into the area to take new construction jobs ($0.195 \times MCWH$);

$ADOE_{1981}$ = the number of indirect jobs filled by household members moving into the area in 1981 to take the new management and design jobs ($0.30 \times MOWH$);

$Net\ IDJM_{1981}$ = the net number of jobs in 1981 to be filled by newcomers moving into the area to take jobs created in subsectors as an indirect result of the construction and operation of the WIPP;

HWF = the factor which accounts for more than one worker per household in immigrating households (0.769);

$MIDWH_{1981}$ = the number of expected newcomer households to the area in 1981 due primarily to jobs in sectors indirectly affected by the construction and/or operational activity of the WIPP;

$AVHSZ_{1981}$ = the average household size in 1981 of individuals moving into the area for jobs created in the indirectly impacted economic activities; and

MIDP1981 = the population moving into the area in 1981 for jobs in sectors indirectly affected by WIPP construction and operation.

From the above formulas, it is apparent that several new characteristics have entered the calculations for determining population. IDE is determined from calculations explained within the employment section of this appendix. It is a direct result of the input-output modeling process. MigID is a subjective number based upon an evaluation of the area in terms of labor availability and needed skill levels associated with indirect new jobs. In this case, the factor is 0.5, which indicates that half of the new jobs created in indirectly affected sectors will be filled by newcomers to the area.

As workers move into the area to take up positions in the construction or operational labor forces, they bring with them households that contain members who also become part of the labor force and are available to fill newly created positions in the area under impact. ADCE accounts for those additional workers brought by construction worker households. The OWRC Construction Worker Profile indicates that between 19 and 29 additional workers for each 100 newcomer construction worker households will take jobs in indirectly affected sectors. In this study, a factor of 0.195 was used to determine the number of additional workers for each household immigrating due directly to construction activity.

ADOE accounts for the number of new workers brought by households immigrating due directly to operational-phase jobs. The OWRC Construction Worker Profile indicates that this number is substantially larger than the factor for the construction workers' households. Between 30 and 31 additional workers will be brought in for each 100 households moving in to take direct operational-phase jobs. A factor of 30% was used in this appendix to account for those additional workers. It is also apparent that when households move in and take up positions in sectors indirectly affected by construction and operational activity, there is also more than one worker per household. Again, this number is approximately 30 to 31 additional workers for each 100 households migrating. Thus, for 100 households, just about 130 workers would be available for positions in indirectly affected sectors. In order to account for these multiple worker households, a factor of $1/1.3 = 0.769$ is used to decrease the number of needed households moving into the area.

Finally, in order to determine the actual population of the resulting households moving into the area, the projected average household size from the Bureau of the Census publications of projected household and family size was used, specifically Population Series I and Household Series C.

The final step in determining the population change to the area due to the construction and/or operation of the WIPP project is to add all three parts that determine population change, i.e., population change caused by construction activity, operational activity, and spinoff activity or indirectly affected economic sectors.

Because the economy may be somewhat slow to react to new jobs, population changes are assumed to lag in the indirectly affected sectors. In order to

achieve this lag in the model, it is assumed that only one-half of the expected immigration will occur within the first year of impact. The remaining individuals are assumed to immigrate during the next year. This assumption allows for a 6 month to 1-year lag in the spinoff effects of the construction and operational phases.

It should be noted that the assumption which allows for a six-month to one-year lag in filling indirect jobs with newcomers does not necessarily affect the timing of the impact on the economy. The impact on the economy is incurred when local purchases or payments to direct labor occur; therefore, the support for the jobs to be filled by the newcomers occurs at an earlier time than the actual filling of the jobs. This means, for example, that individuals who receive income from working on the construction of the WIPP project do not wait to spend their income until population-serving businesses increase their employment. For those economic entities which are indirectly affected by the construction and operation of the power plant, there will be a period of time in which new economic activity creates support for new jobs, but those jobs have not yet been filled. This would mean that the productivity of employees would have to increase above the average until employers recognize the need for new employees and those employees are hired. Therefore, there is no discrepancy between calculating the impact due to the plant and the associated jobs supported at the time of that impact and assuming that the economy does not instantaneously react in terms of new employees for those entities which are indirectly affected by the WIPP project.

The total immigrating population for a given year is determined by adding the population migrating due to construction, the population migrating due to operation, and the population moving in due to new activity in indirectly affected economic sectors. This is accomplished by the following formula:

$$MCP_{1981} + MOP_{1981} + 0.5 MDP_{1981} + 0.5 MDP_{1981-1} = MP_{1981}$$

$$[303 + 72 + 194 + 39 = 608 \approx 600]$$

where

- MCP₁₉₈₁ = population migrating due directly to construction jobs;
- MOP₁₉₈₁ = population migrating due directly to management and design (or operational) jobs;
- MDP₁₉₈₁ = population migrating due to jobs supported indirectly by construction and operational activities; and
- MP₁₉₈₁ = total migrating population for 1981 (= 608 ≈ 600)
- MDP₁₉₈₁₋₁ = population migrating due to jobs supported indirectly by construction and management and design activities (or operational) jobs in 1980.

A final word of caution should be provided. The sample calculations for 1981 above are for impact during the second year of construction. The annual number of people moving into the area in following years is not necessarily the same. Calculations must also be made for each succeeding year.

As the construction phase of the WIPP ends and the full operational phase begins (1987), the job situation will change drastically. From the end of 1984 through 1986 a transitional period between construction and operation will cause significant changes in the population. These population changes, i.e., negative changes or outflows, are computed in a similar manner to the previous example. However, other studies, such as the Construction Worker Profile, indicate that individuals do not leave immediately. This lag has been taken into account in determining the transitional phase of the project. The final results of all of the calculations appear in Table A-13.

These predictions have been made for two different population distribution scenarios. The first Scenario assumes that 99% of the direct impact and 90% of the indirect impact will go to Eddy County, with only 1% of the direct impact and 10% of the indirect impact going to Lea County. The second Scenario assumes that 42% combined impact will go to Lea County and 58% combined impact will go to Eddy County.

The two different Scenarios are the result of interviews conducted with six large potash mining operations in the area. Carlsbad is the center of potash mining activity and more than 95% of the present potash miners live in the Eddy County area. However, one company recruits mainly in the Hobbs area, and as a result 42% of its employees live in Lea County.

WIPP construction and operation will be similar to a combination of construction, mining and warehousing operations. Thus the WIPP project should operate similarly to the potash mining companies in the area. Thus, the first Scenario assumes that the major impact will be felt in the Eddy County area, including about 88% in Carlsbad. It was assumed that the contractors would recruit employees from the Carlsbad area for construction and operation of the Waste Isolation Pilot Plant.

Subsequent discussions indicated that it was possible that the yet-to-be-announced construction and operation contractors might recruit from the Hobbs area, with the major impact being on Lea County and the city of Hobbs. To provide predictions for this possibility, a second Scenario was undertaken as outlined above.

It should also be noted that population predictions for the cities listed include only population within the incorporated limits and do not include the fringe areas. In the cases of Hobbs and Carlsbad these fringe areas contain from 3,000 to 5,000 additional people each.

Table A-13. Baseline Population Estimates and Projections (without WIPP)

Year	Eddy County	Carlsbad	Carlsbad School District	Loving	Loving School District	Lea County	Hobbs	Hobbs School District
1970	41,119	21,297	25,961	1,192	1,350	49,554	26,025	29,858
1975	42,900	N/A	N/A	N/A	N/A	51,600	N/A	N/A
1976	45,300	25,500	29,300	N/A	N/A	53,100	29,600	33,400
1977	46,200	26,600	30,400	1,488	1,650	55,100	30,550	34,500
1978	47,300	27,900	31,600	1,550	1,700	56,300	31,650	35,650
1979	48,200	28,600	32,400	1,600	1,750	57,500	32,600	36,650
1980	49,300	29,500	33,300	1,650	1,800	58,700	33,450	37,550
1981	50,200	30,200	34,100	1,650	1,800	60,000	34,400	38,550
1982	51,600	31,300	35,300	1,700	1,850	61,200	35,250	39,450
1983	52,000	31,600	35,700	1,700	1,850	62,500	36,200	40,450
1984	52,900	32,300	36,400	1,750	1,900	63,800	37,150	41,450
1985	53,800	32,800	37,000	1,800	1,950	65,200	38,150	42,500
1986	55,100	33,600	37,900	1,800	1,950	66,500	38,900	43,350
1987	56,400	34,400	38,800	1,850	2,000	67,700	39,600	44,150
1988	57,800	35,300	39,800	1,900	2,050	68,800	40,250	44,850
1989	59,200	36,100	40,700	1,950	2,100	69,900	40,900	45,600
1990	60,600	37,000	41,700	2,000	2,150	70,900	41,500	46,250
1995	64,300	39,200	44,200	2,100	2,250	75,100	43,950	49,000
2000	68,300	41,700	47,000	2,250	2,450	79,000	46,200	51,500

N/A: Not available.

Source: 1970 data from 1970 Census of Population. All other data new this report; Larry Adcock and Associates, 1979.

A.5 PERSONAL INCOME

A.5.1 General

The change in total annual personal income in the two-county area is determined from the direct wages paid during the construction and operational phases of the WIPP, allowing for a certain amount of fringe benefits. Indirect total personal income generated is computed by determining what proportion of labor costs will enter the total personal income stream from the total number of dollars allocated to labor costs.

In addition to wages, dividends, interest, and rents also account for a portion of the total personal income. That proportion has been estimated after examination of unpublished regional printouts for the two-county area provided by the Bureau of Economic Analysis to the Bureau of Business and Economic Research at the University of New Mexico. (Tables A-14 and A-15.)

From these two tables it is apparent that total labor and proprietors' income in 1977 (the latest year available) amounted to some \$526.3 million in the two-county area. Interest, dividends, and rents accounted for \$72.3 million (13.7%) in additional income based upon total labor and proprietors income. Further calculations indicate a plus or minus 4% variation (approximately) from this figure, depending on which year of the last few years is examined. The actual figure used for this study was 14%.

The other major factor taken into consideration in total annual personal income is transfer payments. As a previously cited printout from the Bureau of Economic Analysis indicates, the flow of transfer payments to the area is positive. However, during the construction phase of the WIPP, the impact of transfer payments on the total personal income stream is assumed to be negative because more Social Security payments will flow out than flow in from those additional jobs created and supported by the construction phase. During the operational phase, however, the impact of transfer payments on the total personal income stream may be either negative or positive. In the early years of operation it should be positive; however, as individuals retire from jobs or positions created by the operation of the WIPP, the transfer payments will return. Therefore, it is assumed that the transfer payments are neutral during the operation of the WIPP. An explanation of and values for total personal income change can be found on the following pages.

A.5.2 Explanation and Values

Table A-16 summarizes some of the information presented in this section. Details appear in the text below.

During the construction period (mid-1980 through mid-1984) and for the period before full operation (mid-1984 through 1986), it is expected that a total of just over \$93 million will flow directly into wages and salaries from the construction of the plant and associated management and design employment. In addition, there will be almost \$46 million in wages and salaries in those businesses indirectly affected by the construction.

Table A-14

NEW MEXICO		PERSONAL INCOME BY MAJOR SOURCES 1972-77 (THOUSANDS OF DOLLARS)					
EDDY	ITEM	1972 1/	1973 1/	1974 1/	1975 2/	1976 2/	1977 2/
Total Labor and Proprietors Income By Place Of Work 3/							
By Type							
	Wage and Salary Disbursements	85,032	91,736	103,723	132,147	148,472	168,934
	Other Labor Income	6,294	7,229	8,999	12,082	14,360	17,385
	Proprietors Income 4/	16,270	19,194	21,864	18,827	23,839	26,427
	Farm	5,258	9,482	7,227	5,701	6,883	6,752
	Non-Farm 4/	11,012	9,712	14,637	13,126	16,956	19,675
By Industry							
	Farm	6,975	11,392	9,041	7,732	9,103	9,121
	Non-Farm	100,621	106,769	125,545	155,324	177,568	203,625
	Private	86,225	91,476	109,280	136,552	155,724	179,886
	AG. Serv., For., Fish., and Other 5/	426	425	486	553	524	587
	Mining	33,166	32,344	41,966	50,315	57,698	68,140
	Construction	5,744	6,771	7,631	13,926	15,736	17,159
	Manufacturing	5,844	6,655	8,430	11,765	14,964	16,879
	Non-Durable Goods	4,459	5,041	6,547	9,705	11,425	13,012
	Durable Goods	1,385	1,614	1,883	2,060	3,539	3,867
	Transportation and Public Utilities	7,355	8,860	9,812	11,336	13,607	16,054
	Wholesale Trade	3,522	4,012	4,959	7,656	7,136	8,330
	Retail Trade	12,370	13,227	15,300	16,666	18,613	21,368
	Finance, Insurance, and Real Estate	3,295	3,397	3,616	4,274	5,316	6,156
	Services	14,503	15,785	17,080	20,061	22,130	25,213
	Government and Government Enterprises	14,396	15,293	16,265	18,772	21,844	23,739
	Federal, Civilian	2,447	2,583	2,794	3,162	3,803	4,009
	Federal, Military	478	526	531	540	579	592
	State and Local	11,471	12,184	12,940	15,070	17,462	19,138
Derivation of Personal Income By Place Of Residence							
	Total Labor And Proprietors Income By Place Of Work	107,596	118,161	134,586	163,056	186,671	212,746
	Less: Personal Contributions For Social Insurance By Place Of Work	5,085	6,102	7,194	8,948	10,027	11,338
	Net Labor And Proprietors Income By Place Of Work	102,511	112,059	127,392	154,108	176,644	201,408
	Plus: Residence Adjustment	201	218	425	-62	-208	-192
	Net Labor and Proprietors Income By Place Of Residence	102,712	112,277	127,817	154,046	176,436	201,216
	Plus: Dividends, Interest, And Rent 7/	20,098	22,278	26,687	31,728	34,838	39,023
	Plus: Transfer Payments	18,529	21,646	25,236	29,529	33,919	36,536
	Personal Income By Place of Residence	141,339	156,201	179,740	215,303	245,193	276,775
	Per Capita Personal Income (Dollars)	3,442	3,781	4,332	5,018	5,415	6,089
	Total Population (Thousands)	41.1	41.3	41.5	42.9	45.3	45.5

1/ Estimates Based On 1967 SIC

2/ Estimates Based On 1972 SIC.

3/ Consists of Wage and Salary Disbursements, Other Labor Income, and Proprietors' Income.

Primary Source For Private Non-Farm Wages: ES-202 Covered Wages - New Mexico Employment Security Commission

4/ Includes The Capital Consumption Adjustment For Non-Farm Proprietors.

5/ Includes Wage And Salaries Of U. S. Residents Working For International Organizations.

7/ Includes The Capital Consumption Adjustment For Rental Income Of Persons.

Source: Regional Economics Information System, Bureau of Economic Analysis.

April, 1979

Table A-15

LEA		NEW MEXICO					
		PERSONAL INCOME BY MAJOR SOURCE, 1972-77 (THOUSANDS OF DOLLARS)					
ITEM		1972 1/	1973 1/	1974 1/	1975 2/	1976 2/	1977 2/
Total Labor and Proprietors Income by Place of Work 3/							
By Type							
Wage and Salary Disbursements		121,107	133,089	163,925	190,942	207,111	236,570
Other Labor Income		10,982	12,343	16,397	20,650	23,585	28,379
Proprietors Income 4/		21,399	24,521	37,549	31,241	42,417	48,604
Farm		7,923	13,766	13,746	12,818	12,430	13,779
Non-Farm 4/		13,406	10,755	23,803	18,423	29,987	34,825
By Industry							
Farm		9,579	15,673	15,689	14,991	14,805	16,312
Non-Farm		143,909	154,280	202,182	227,842	258,308	297,241
Private		127,968	137,470	184,385	207,165	234,457	271,081
AG. Serv., For., Fish., and Other 5/		635	694	(D)	(D)	692	804
Mining		42,573	46,162	74,419	79,026	93,976	112,645
Construction		8,287	8,498	13,051	14,417	14,724	16,645
Manufacturing		7,545	8,284	10,021	12,609	14,070	16,539
Non-Durable Goods		5,172	6,127	7,775	9,562	11,329	13,229
Durable Goods		2,373	2,157	2,246	3,047	2,741	3,310
Transportation and Public Utilities		22,591	23,952	27,343	32,506	36,330	39,662
Wholesale Trade		9,162	9,972	12,329	15,502	17,642	20,483
Retail Trade		15,846	16,810	18,842	21,100	23,541	26,650
Finance, Insurance, and Real Estate		4,838	5,296	(D)	(D)	8,173	9,812
Services		16,491	17,802	22,090	24,728	25,309	27,841
Government and Government Enterprises		15,941	16,810	17,797	20,677	23,851	26,160
Federal, Civilian		1,294	1,428	1,575	1,827	2,043	2,258
Federal, Military		494	534	537	564	599	643
State and Local		14,153	14,848	15,685	18,286	21,209	23,259
Derivation of Personal Income by Place of Residence							
Total Labor and Proprietors Income by Place of Work		153,488	169,953	217,871	242,833	273,113	313,553
Less: Personal Contributions for Social Insurance By							
Place of Work		7,050	8,651	11,376	12,850	14,226	16,146
Net Labor and Proprietors Income by Place of Work		146,438	161,302	206,495	229,983	258,887	297,407
Plus: Residence Adjustment		807	-114	-1,689	-986	-924	-896
Net Labor and Proprietors Income by Place of Residence		147,245	161,188	204,806	228,997	257,963	296,511
Plus: Dividends, Interest, and Rent 7/		18,505	19,678	23,907	28,132	29,909	33,269
Plus: Transfer Payments		15,440	18,055	20,878	25,018	28,468	30,674
Personal Income by Place of Residence		181,190	198,921	249,591	282,147	316,340	360,454
Per Capita Personal Income (Dollars)		3,643	4,028	5,014	5,464	5,954	6,811
Total Population (Thousands)		49.7	49.4	49.8	51.6	53.1	52.9

1/ Estimates Based On 1967 SIC

2/ Estimates based on 1972 SIC.

3/ Consists of Wage and Salary Disbursements, Other Labor Income, and Proprietors' Income.

Primary Source for Private Non-Farm Wages: ES-202 Covered Wages - New Mexico Employment Security Commission

4/ Includes the Capital Consumption Adjustment for Non-Farm Proprietors.

5/ Includes Wage and Salaries of U.S. Residents Working for International Organizations.

7/ Includes the Capital Consumption Adjustment for Rental Income of Persons.

(D) Not Shown to Avoid Disclosure of Confidential Information, Data Are Included in Totals.

Source: Regional Economics Information System, Bureau of Economic Analysis.

April, 1979

Table A-16. Personal Income Due to WIPP^{a,b}

Income Type	1980	1981	1982	1983	1984	1985	1986	Total before full operation	Operation each year-- 1987 & after
Direct wages & salaries	2.2	9.3	28.1	27.8	8.4	7.3	10.1	93.2	11.9
Indirect wages & salaries	1.0	4.9	13.7	13.0	4.2	3.7	5.2	45.7	5.5
Interest, dividends, and rents	0.5	2.1	6.1	6.0	1.9	1.6	2.2	20.4	2.5
Total private sector income	3.7	16.3	47.9	46.8	14.5	12.6	17.5	159.3	19.9
Public sector income	0.1	0.6	1.8	1.8	0.6	0.5	0.7	6.1	0.8
Net transfer payments	(0.2)	(0.9)	(2.6)	(2.6)	(0.8)	(0.3)	(0.5)	(7.9)	c
Net personal income	3.6	16.0	47.1	46.0	14.3	12.7	17.8	157.5	20.7

^aEntries are millions of 1979 dollars. Parentheses indicate negative amounts.

^bThe figures for the construction period 1980 through 1986 include management and design activity.

^cTransfer payments during the operational phases are assumed to be neutral over time.

Source: Larry Adcock and Associates, 1979.

Personal income from interest, dividends, and rent is expected to total an estimated \$20 million during the six and one-half year period. A total of about \$140.5 million is expected to be derived both directly and indirectly in the private sector. In the public sector, about \$6 million in personal income will come from the increased activity in the area from additional State and local government and indirectly affected federal agency employment required for support. Thus, total personal income added to the area during the construction phase of the WIPP project is expected to be \$165 million from the beginning of construction until full operation at the beginning of 1987. However, net loss from transfer payments (generally Social Security payments) will decrease this total to just less than \$158 million.

The personal income to be derived from the operation of the WIPP project will be significantly different from that derived in the construction phase. The amount of money flowing directly into the local economy during a normal year of operation will be approximately \$16.9 million. Although this amount may vary with expenditure patterns in the operation of the plant, this appendix uses a constant figure of \$16.9 million. This figure is significantly different from the total direct expenditures of \$40-42 million annually during the peak years of the construction period.

The estimated \$16.9 million annual flow directly associated with the operation of the plant with local procurement and labor will mean that (1) approximately \$11.9 million will be realized in personal income by those individuals connected directly with the plant; (2) wages and salaries derived from the indirect effect on businesses within the area will amount to almost \$5.5 million; (3) government expenditures required by additional activity and flowing into personal income will total about \$0.8 million per year; (4) new dividends, interest, and rents will create approximately \$2.5 million in personal income; and (5) during the first years of operation, net transfer payments will be negative and later they will have a net positive effect. Because of this balancing effect, transfer payments for an average year have been considered neutral. The net result, therefore, will be an increase in total personal income on an annual basis of approximately \$20.7 million.

A.6 HOUSING AND LAND USE

The demand for new housing depends on population and household size. The housing demand projections developed for the impact analysis prepared in conjunction with this appendix are based on population projections discussed previously and household size projections derived from several sources.

Household size for the baseline population is based on household size projections in Bureau of the Census Publication P-25, No. 607, adjusted to 1970 household size in the impact area (derived from the 1970 Census of Housing). Thus, if 1970 household size in the impact area is above the U.S. average in that year, projected household size in the impact area will be adjusted upward from the projected U.S. average.

Household sizes for project induced population changes come from two basic sources. For construction workers and their families, household size is based on information contained in the Construction Worker Profile (Old West Regional Commission, Washington, 1975). For operations employees and families as well as for induced and indirect population changes, household size depends on the likely place of origin of the individuals moving into the area. If there is no obvious or logical single place of origin, then U.S. average household size (from Bureau of Census Publication P-25, No. 607) will be used. If it appears that most of the individuals will be likely to come from elsewhere in New Mexico, then U.S. household size projections will be adjusted to account for past state differences with the U.S. average.

Once household sizes have been projected, the demand for housing units is determined by dividing the household size into the appropriate population component. For baseline population changes, the population component is essentially the entire population, with a small adjustment for the portion of the population not living in housing units. This latter group is generally a small fraction of the total population, comprised primarily of people living in nursing homes. The population components for project related populations are derived using methods discussed earlier in this appendix.

The demand for occupied housing units provides the base for a second set of calculations which indicate the housing stock necessary to maintain a 3% vacancy rate. This is found simply by dividing the demand for occupied units by 0.97.

The amount of construction activity needed to meet the demand for housing at a 3% vacancy rate is then calculated, based on present assessment of housing and vacancy rate figures and projected housing requirements.

Finally, housing requirements are allocated to housing types (single family, multifamily, and mobile home) based on information in the Construction Worker Profile (op. cit.). Table A-17 indicates housing type demands of three classes of population: newcomer construction workers, other newcomers, and long-time residents. Baseline populations are assumed to have the same housing type demands as the "long-time residents," while preferences of "newcomer construction workers" are used to allocate housing types for project induced construction newcomers. Other induced and indirect immigrants resulting from the project are assumed to have the same preferences as those of "other newcomers."

Methods used to calculate land requirements for projected population increases depend on the relative scale of population changes, both under baseline and impact conditions. For small relative changes in population (and therefore, small changes in housing demand) the principal demand for land is for housing units and roads. In this case, land use requirements are calculated on the basis of a relatively generous average lot size, e.g., one-quarter acre per housing unit. The assumption is that relatively small increases in population will not require proportional increases in all municipal land use categories. For example, a 5% population increase should not require a 5% increase in land requirements associated with such public facilities as city hall, police stations, and fire stations. In essence, it is assumed that there is some excess capacity in the land associated with such facilities.

Table A-17. Housing Demand (Percent)

Type of Unit	Newcomer Construction Workers	Other Newcomers	Long Time Residents
Single family	34	55	81
Multifamily	11	17	5
Mobile home and other	<u>56</u>	<u>27</u>	<u>14</u>
Totals	101	99	100

Columns do not sum to 100 due to rounding.

Source: Old West Regional Commission, Construction Worker Profile, Washington, D.C., 1975, p. 103.

For larger relative population increases, the basic assumption is that land requirements for virtually all types of land use will grow in proportion to the housing stock. In this situation, total land occupied in the municipality is divided by the amount of housing to obtain land required for each unit of housing.

Finally, it should be noted that for different purposes, either of the methods above may be appropriate in determining land use requirements. For example, baseline population growth may be substantial, calling for the use of a large figure for land required for each housing unit, while the marginal change associated with the impact population is small, thus requiring only a small land use figure. Conversely, there are instances in which baseline growth is expected to be small while project impact is expected to be large, which indicates that a small baseline land figure and a large impact figure are appropriate.

A.6.1 Community Services and Facilities

In the analysis of the impacts of population or other changes on the demand for community services and facilities, there are basically two sorts of impacts that may emerge. First, in most cases there will be an increase in the demand for service more or less in proportion to population or housing increases. For example, more people will require more water, generate more sewage, and need more medical assistance. As a result of the increased demand for the service, personnel requirements and operating expenses generally rise. (For a discussion of operating expenses see the following section on fiscal impact analysis.)

The second sort of impact that may emerge is an overloading of some part of the system that has a fixed capacity. Generally, fixed capacity implies some type of capital facility such as a school or sewage treatment plant, but it also includes water rights.

The analysis of impacts on community services and facilities then requires two basic steps. First, changes in the demand for variable parts of the system, e.g., personnel, cubic feet of natural gas, must be projected. Then, projected increases in demand must be compared to the existing capacity of those parts of the system which are not readily varied in small increments. In other words, an important part of the analysis is to determine if one of the impacts of a proposed action is to require the construction of, e.g., a new sewage treatment plant.

Two basic methods are used to project the demand for services: the per capita multiplier method and the per household (or its equivalent--per occupied housing unit) multiplier method. (For a discussion of the appropriate application and the advantages and disadvantages of these methods, see Robert Burchell, David Listokin et al., The Fiscal Impact Handbook, Center for Urban Policy Research, New Brunswick, New Jersey, 1978.) Generally, the latter method is used to project demands for natural gas, electricity, and telephone service while the former is used to project the demands for water, sewage treatment, solid waste disposal, fire and police protection, and medical service. With slight modification, the per capita multiplier method is used to project traffic flows as well.

The multipliers used in each approach are based on recent actual per capita or per household figures in the impact area, with adjustments made where appropriate. Adjustments are made when national, regional, or local data indicate that recent per capita or per household levels may not remain unchanged over time. For example, in projecting water demand for New Mexico communities, per capita use rates are changed over time in the same proportion as the changes projected by the New Mexico State Engineer in the County Profile series (New Mexico Interstate Stream Commission and New Mexico State Engineer Office, County Profile (various counties), Santa Fe, New Mexico, 1975).

Adjustments are also made if very recent changes in some key factor have caused historical per capita or per household use rates to be unreliable for future projections. For example, if a water rate (price) increase has occurred within the past year, resulting in less than a full year's data at the new rate, per capita use rates will be adjusted based on water demand price elasticity estimates. (For a discussion of water demand price elasticity estimates, see Gilbert Bonem, Micha Gisser, John Myers, and Mark Resta, Water Demand and Supply in the Albuquerque Greater Urban Area, Bureau of Business and Economic Research, University of New Mexico, December 1977.)

Once demand for a service has been projected, it is compared to the service capacity of the fixed components of the system. This is generally a straightforward numerical comparison, e.g., acre feet per year of water demand versus annual water rights. Those areas in which demand exceeds existing capacity are identified and the implications of the excess demand are noted.

For several reasons, the level of detail varies considerably in the analysis of each community service category. First, after investigation of the existing service capacity in some area it sometimes becomes evident that considerable excess capacity exists relative to any potential change in demand resulting from baseline or impact population changes. A similar situation arises when the impact area is small relative to the service area, as is often the case with natural gas, electric, and telephone service. In this case, even relatively large baseline or impact population changes in the impact area have little effect on the overall service area. In both situations (significant excess capacity and small impact area relative to service area) a detailed analysis is generally unwarranted.

At the other extreme, sometimes the relative impact on the demand for a service of a proposed action is large. In this instance, every effort is made to determine in detail the extent of the impact. This often involves extensive interviews with the manager or other personnel of the department or company providing the service.

Finally, in many cases baseline projections use less sophisticated techniques, e.g., unadjusted per capita multipliers, than those for impact projections. This is because baseline projections generally are intended to provide a background against which impact is evaluated, and not to be a precise projection of service level demands under baseline conditions. The key factor in the analysis of baseline projections is the effect on system capacity. If a new sewage treatment plant or school is required under baseline conditions during the period under analysis, then the capital cost of the facility is not assigned to the proposed action whose impact is being studied. On the other hand, if capital facilities or water rights are adequate under baseline conditions but inadequate under impact conditions, the burden of reduced service levels or increased capital costs rests on the proposed action. A more detailed discussion of the treatment of costs is presented in Section A.7 of this appendix.

A.7 FISCAL IMPACT ANALYSIS

Projection techniques for county and municipal revenues are essentially the same. The first step is to collect data on past revenue levels. For New Mexico counties the source is generally the Department of Finance and Administration, New Mexico County Governments, Annual Report. For New Mexico Municipalities the source is the equivalent annual report series, New Mexico Municipal Governments. During that part of the year after the end of the fiscal year, but before the publication of the annual reports, county and municipal governments are contacted to obtain reports for the most recent fiscal year.

Once data covering several years have been collected, a preliminary analysis is made. This involves putting each major revenue category (fund) in constant dollars, using the Gross National Product Price Index as a deflator, and examining the record for pronounced trends or major changes. If such

trends or changes are found, they are considered in making projections. However, trends generally are gradual and they are usually ignored. Major changes usually result from increases in revenues which are not expected to continue each year. These are generally revenues from bond sales or from special government transfers, e.g., drought relief. Such changes are noted and considered in subsequent stages of the projection process, as described below.

A.7.1 Revenues

After the preliminary examination of the budget is completed, the most recent fiscal year revenues are separated into the categories indicated in Table A-18. These categories present a clear picture of the type and source of revenues, a picture that is not evident when revenues are classified by fund as they generally are in municipal or county budgets.

Once revenues have been allocated to the proper categories, projections are made. The revenue projection method is based on modifications of methods suggested in The Fiscal Impact Handbook, op. cit. For baseline projections, most revenue items are projected on a per capita basis. A smaller group are projected on a per housing unit basis, and occasionally a revenue item is projected to show no change.

For most revenue items the most recent actual annual per capita or per housing unit level is taken as the most reliable guide to future levels. Although budgeted levels for the coming fiscal year are checked for major changes from past amounts, budgets are felt to be an unreliable basis for making projections. For one thing, they are themselves projections, and their accuracy depends on the skill of the municipal or county officials making them. There is also a tendency for budgets to include a rather large "other" category with unspecified components. Finally, comparison of past budgeted revenues with actual revenues shows a rather large discrepancy between budgeted and actual amounts.

In choosing the most recent actual revenue levels as the guide to the future, several assumptions are made. First, it is assumed that tax rates will not change. While this is probably not a reliable assumption, the alternative is to project the behavior of elected officials, many of whom have not yet been elected, since it is these office holders who set tax rates. The "no change" assumption seems the more conservative of the two alternatives.

A similar set of assumptions (that is, no change) applies to the level of charges for services, such as utility rates, and distribution formulas for State and Federal transfers. Again, it is not felt that these items will never change, but that predicting the direction and timing of such changes is less reliable than assuming no change.

In essence, the use of the most recent actual revenue level combined with the per capita or per housing unit projection method indicates what revenue levels would be if current conditions continue into the future.

There are some exceptions to the use of the per capita or per housing unit projection method. Some revenue sources are clearly independent of local

Table A-18. Revenue Categories and Projection Methods
Used For New Mexico Municipalities and Counties

Own Source Revenues	Municipal	County
<u>Taxes</u>		
Property	PH	PH
Franchise (M)	PC	
Occupation (M)	PC	
Oil and gas	NC/T	NC/T
Lodgers	PC	PC
Gross Receipts	PC	PC
<u>Charges and Miscellaneous</u>		
Licenses, permits, and fees	PC	PH
Charges for services	PC	PC
Fines and forfeits	PC	PC
Utilities (M)	PH	
Interest on Investments	PC	PC
Payments in Lieu of Taxes	PC	PC
Miscellaneous	PC	PC
<u>INTERGOVERNMENTAL TRANSFERS</u>		
<u>State</u>		
Gasoline taxes	PC	PC
Auto license distribution (M)	PC	
Cigarette taxes	PC	PC
Gross receipts taxes (M)	PC	
Motor vehicle (C)		PC
Fire allotment	PC	PC
Grants	PC	PC
Miscellaneous (C)		PC
<u>Federal</u>		
Revenue sharing and grants	PC	PC
Miscellaneous (C)		PC
<u>Local (M)</u>	PC	
<u>Other*</u>	PC	PC

C = County revenue item only.

M = Municipal revenue item only.

PH = Projection on per housing unit basis.

PC = Projection on per capita basis.

NC = No change projected.

* = Included in "other" are revenues not clearly assignable to specific sources.

SOURCE: Adcock and Associates, 1979.

population or household levels, due either to the nature of the tax base or to the distribution formula. For example, in some counties in New Mexico, oil and gas production (severance) taxes are an important revenue source. These taxes are based on the level of oil and gas production in these counties, a tax base which is not influenced by population or the housing stock.

Four alternatives are available for the projection of such a revenue source. First, an independent projection of the tax base may be utilized. However, such projections are frequently unavailable. A second possibility is to generate a projection of the base, a process which is usually too time-consuming (and expensive) for purposes of an impact analysis. The third approach is to rely on recent trends in the base--or in the tax revenue itself. This is often the best alternative given the limits of time and budget, but there are situations in which it is not appropriate. For example, in the case of the oil and gas production taxes mentioned above, the recent history of the industry shows great fluctuations in this source of revenue in some counties. As a result, no statistically reliable recent trend can be isolated. This makes it necessary to use the fourth method, which is to assume no change in the total (as opposed to per capita) level of this source of revenue. While this is the most conservative assumption under the circumstances, it leads to problems when projected revenues are compared to projected expenditures. More will be said about this problem after expenditure projection methods are discussed below.

There are also exceptions to the use of the most recent actual revenue level for projections, even when per capita or per housing unit projections are used. These exceptions are generally made for those nonrecurring revenue items mentioned above (bond proceeds and government transfers) which may have occurred in the most recent year. In the case of bond proceeds, it is generally assumed that no bond sales will occur unless a specific bond issue has been planned.

For government transfers, the general rule is that the most recent year is used except for those programs which are obviously not recurring.

The same general methods are used to project revenues resulting from the impact of the proposed action. However, if major capital expenditures were required under impact conditions that would not be required under baseline conditions, an attempt is made to project the magnitude and timing of bond revenues to finance the expenditures.

Table A-18 indicates the specific projection methods used for municipalities and counties in New Mexico. In most instances the per capita multiplier method is used. There are three reasons for choosing this method. First, in many cases, e.g., gross receipts taxes, it is clearly the best available alternative.

In some cases it is used even though some other method is clearly better. An example of this is Taylor Grazing Act fees (a federal transfer) going to the county. Since the base is independent of population, these fees would not be expected to rise in proportion to county population. However, the actual amount of revenue from this source is so small that making an independent

projection or assuming no change would involve computational complexities not offset by measurable improvement in the reliability of the overall revenue projection. Therefore, this source is included with other federal transfers and the entire sub-group is projected on a per capita basis.

A third group of revenue items is projected on a per capita basis even though population represents only one of the determining factors in the revenue level. This group includes gasoline tax, cigarette tax, and auto license distributions from the state, all of which have distribution formulas in which population is only one factor. However, it can be shown that if the other items in the distribution formula increase in proportion to population, then per capita projection methods are appropriate. This condition is likely to be met fairly closely when comparing revenues under baseline and impact conditions. For example, in calculating gasoline tax distributions the ratio of roads in the local jurisdiction to roads in the state is used along with population. If the number of miles of road in a local area, e.g., municipality, is higher under impact conditions than under baseline conditions in rough proportion to the relative population levels under the two conditions, then the per capita share of gasoline tax distributions will be the same under both conditions. Thus, the use of the per capita projection method may somewhat bias the baseline revenue projections, but will be relatively accurate in comparing baseline and impact conditions.

Revenue items projected on the basis of housing units include utility fees, property taxes, and fees, e.g., building permits, since these are more closely related to the number of housing units than to population.

The only item projected to show no change in the total revenue level in the two examples shown is the oil and gas tax category for the county.

A.7.2 Expenditures

As with revenues, the projection methods used for county and municipal expenditures are essentially the same. The process begins with the acquisition of data from the same sources as those for revenues. Spending for several years is then converted to constant dollars using the Gross National Product Price Index. Municipal expenditures are allocated by fund while county expenditures are allocated to service functions, e.g., public works, public safety, as dictated by the format of the original data.

Once the data are in constant dollars, they are examined for major trends and non-recurring items, which are noted and accounted for in the projection process.

After preliminary analysis of the data, the projections are made. The methods used are a combination of the per capita multiplier method and the case study method, as set forth in The Fiscal Impact Handbook, op. cit. Basically, this involves projecting future expenditures on the basis of the most recent actual per capita levels, with the exception that non-recurring capital spending items are excluded.

The projections made in the analysis of the demands for community services and facilities provide the basis for the capital spending forecasts. If these projections indicate excess capacity for a particular capital facility for the period under analysis, only recurring capital expenditures are included in the service function. On the other hand, if a capital facility is projected to become inadequate in the future, estimates of expansion costs are included in the forecasts. Recurring capital spending is based on statewide county or municipal averages, derived from Department of Finance and Administration Annual Reports, op. cit. Capital facility costs are derived from various sources generally in the building industry. Capital facility costs are expressed in terms of annual debt service.

The same general methods apply to baseline and impact projections. In both cases the approach is to isolate those factors which will result in deviations from recent per capita spending levels and to incorporate those changes in spending projections.

A.7.3 Net Fiscal Impacts

The underlying philosophy used to make baseline projections of revenues and expenditures is somewhat different from that used to make impact projections, although the methods used in each case are similar. Baseline projections are used to judge impacts. As a result, less detail goes into the baseline projections. For example, for counties, all spending is projected to grow in proportion to population under baseline conditions, while some revenue items may not be projected to grow. This can result in a projected deficit for a county. However, the proper interpretation of this result is not that the county is necessarily facing fiscal difficulties, but rather that if spending grows in proportion to population, some revenue sources will have to increase by more than the projected amount. As an alternative, spending (and service) levels may be reduced from current per capita levels.

No matter what fiscal adjustments may be made under baseline conditions, the baseline projections are intended to indicate orders of magnitude for spending and revenues during the period under analysis.

On the other hand, impact fiscal projections are intended to show, with as much accuracy as possible, given historical data and information obtained in interviews with local officials, the actual likely fiscal effect of the proposed action. Every effort is made to include in the analysis only those fiscal impacts associated with the proposed action. Thus, a projected fiscal deficit or surplus associated with the proposed action should be interpreted as such. Not only is greater detail incorporated into impact projections, but generally these projections can be made with greater reliability than can baseline projections. For example, projecting oil and gas tax revenues causes problems under baseline conditions, but since oil and gas production generally is not expected to be affected by the changes associated with a proposed project, no change in these revenues is attributable to the project, regardless of what happens to oil and gas taxes.

BIBLIOGRAPHY

- Association for University Business and Economic Research. Proceedings 1975 Conference. "Federal Data for University Research." Williamsburg, Virginia, 1975. Pages 110-137.
- Association of Western Railways. Railroad Facts, 1977 (Chicago: Association of Western Railways, 1977).
- Bonem, Gilbert, Micha Gisser, John Myers, and Mark Resta, Water Demand and Supply in the Albuquerque Greater Urban Area. Bureau of Business and Economic Research, University of New Mexico, Albuquerque, New Mexico, December 1977.
- Burchell, Robert W., David Listokin, et al., The Fiscal Impact Handbook. Center for Urban Policy Research, New Brunswick, New Jersey, 1978.
- Bureau of Business and Economic Research. New Mexico Statistical Abstract. 1977 Edition. New Mexico: The University of New Mexico, 1977.
- Bureau of Economic Analysis, Regional Economic Information System. "Employment by Type and Broad Industrial Sources 1971-1975, Full and Part-time Wage and Salary Employment Plus Number of Proprietors." New Mexico. (Xeroxed tables).
- Bureau of Economic Analysis, Regional Economic Information System. "Per Capita Personal Income in SMSAs, Counties and Independent Cities, in Selected Years, 1967-1975." New Mexico. (Xeroxed tables).
- Bureau of Economic Analysis, Regional Economics Information System. "Personal Income by Major Sources 1970-1975." New Mexico. (Xeroxed tables).
- Gleason, Ken. 1978. Hobbs Assistant City Manager. Interview (with Larry Adcock).
- Herkenhoff, Gordon and Associates, Inc. 1976. Water and Wastewater Master Plan, 1975-1995, Water Supply Study, City of Hobbs, New Mexico: December 1975.
- Industrial Development Corporation of Lea County. Hobbs, New Mexico. Hobbs, New Mexico.
- Lehman, Charles. Manpower Economist. Personal interview (with Larry Adcock). 1977 and 1978.
- Lyon, Edgar P., 1977-1978. Director, Department of Development, Carlsbad, New Mexico. Personal interview (with Larry Adcock).
- McNabb, Dan. 1978. Hobbs Director of Development. Personal interview (with Larry Adcock).

Mountain West Research, Inc. Final Report. A Study for the Old West Regional Commission. Construction Worker Profile. December 1975.

New Mexico Department of Finance and Administration. New Mexico County Governments, Annual Report (various years), Santa Fe, New Mexico.

New Mexico Department of Finance and Administration. New Mexico Municipal Governments, Annual Report (various years), Santa Fe, New Mexico.

New Mexico Employment Security Department. "Estimates of Average Size of Household and Family, 1940 to 1974, and Projections, 1975 to 1990, for the United States." Page 16. (Xeroxed Table 3).

New Mexico Employment Security Department. Various unpublished information. 1972-1978.

New Mexico Interstate Stream Commission and New Mexico State Engineer Office, County Profile (various counties), Santa Fe, New Mexico.

U.S. Bureau of Mines. Minerals Yearbook, 1974, Vols. 1-3. (Washington, D.C.: U.S. Government Printing Office, 1974.)

U.S. Bureau of the Budget. Standard Industrial Classification Manual, 1967 and 1972. (Washington, D.C.: U.S. Government Printing Office, 1967 and 1972.)

U.S. Bureau of the Census. Census of Manufacturers. "1972 Area Series, New Mexico." MC72(3)-32. U.S. Government Printing Office, Washington, D.C. 1975.

U.S. Bureau of the Census. Census of Manufacturers. "1972 Industry Series." MC72. U.S. Government Printing Office, Washington, D.C. 1974-1975.

U.S. Bureau of the Census. Census of Mineral Industries. "1972 Area Series Mountain States." MIC72(2)-8. U.S. Government Printing Office, Washington, D.C. 1975.

U.S. Bureau of the Census. Census of Mineral Industries. "1972 Subject Series." MIC72. U.S. Government Printing Office, Washington, D.C., 1975.

U.S. Bureau of the Census. Census of Population: 1970. General Population Characteristics. Final Report PC(1)-B33, New Mexico. U.S. Government Printing Office, Washington, D.C., 1971.

U.S. Bureau of the Census. Census of Population: 1970. General Social and Economic Characteristics. Final Report PC(1)-B33, New Mexico. U.S. Government Printing Office, Washington, D.C., 1971.

U.S. Bureau of the Census. U.S. Census of Population: 1970. Number of Inhabitants. Final Report PC(1)-A33, New Mexico. U.S. Government Printing Office, Washington, D.C., 1971.

U.S. Bureau of the Census. Current Population Reports. Series P-25, No. 640. "Estimates of the Population of States with Components of Change: 1970 to 1975." U.S. Government Printing Office, Washington, D.C., 1976.

U.S. Bureau of the Census. Current Population Reports. Series P-25, No. 607. "The Number of Households and Families, 1975-1990." U.S. Government Printing Office, Washington, D.C., 1976.

U.S. Bureau of the Census, Census of Housing, General Housing Characteristics, New Mexico, June, 1971.

U.S. Department of Agriculture. Agricultural Statistics, 1975. U.S. Government Printing Office, Washington, D.C., 1975.

U.S. Department of Commerce. Bureau of the Census. Federal - State Cooperative Program for Population Estimates. Series P-26, No. 76-31. U.S. Government Printing Office, Washington, D.C., 1977.

U.S. Department of Labor. Employment and Wages, 1975. U.S. Government Printing Office, Washington, D.C., 1976.

Tiebout, Charles M. The Community Economic Base Study. New York: Committee For Economic Development. 1962.

Zink, Lee B. "A Note on Population Projections." New Mexico Business. August 1972. Pages 23-29.

ANNEX

A NON-SURVEY TECHNIQUE FOR CONSTRUCTING
A DIRECT REQUIREMENTS REGIONAL INPUT-OUTPUT TABLE

by

Larry Adcock, Associate Director & Economist
Bureau of Business & Economic Research
University of New Mexico

Larry Waldman, Doctoral Candidate
Department of Economics
University of New Mexico

A-62

INTRODUCTION

In an article entitled "An Appraisal of Non-Survey Techniques for Estimating Regional Input-Output Models," David G. McMenamin and Joseph Haring state that:

Non-survey or minimum-survey methods for constructing regional input-output tables are attractive to model builders because of the relatively small cost involved as compared with full survey models. (9)

McMenamin and Haring go on to state that many of the non-survey techniques have not been highly successful in the past, but recently accuracy seems to have improved by the use of newly developed techniques. Indeed, the full survey method of building input-output tables is costly. While records are rather poor, it is estimated that the 1960 New Mexico table cost approximately \$100,000 to construct and work was accomplished over a three-year period. Recent estimates indicate that a new table for New Mexico of the full-survey type would probably cost well over \$100,000.

Such costs for a full-survey table for relatively small states makes the non-survey technique desirable in terms of available resources. However, the level of accuracy of the non-survey technique table is still in question. Therefore, in this study, an in-depth examination of several aspects of the location quotient adjustment process for deriving a non-survey input-output table from national coefficients was undertaken. In performing the task, two basic questions were answered: (1) can the table be constructed with available data and available techniques, and (2) how does the table compare with a full-survey based table?

The results of this study could be extremely important not only to the research work being conducted at the University of New Mexico, but to the State in general. Since the 1960 New Mexico full-survey table was compiled, little updating has occurred (2, Appendix A). In early 1970 an examination was made of this original survey-based table to determine if a household sector could be added to the direct coefficients table given the information available from the national level. This was accomplished in 1971. Basically, this constitutes the updating of the original 1960 table.

It is apparent that since the economic sector mix and the level of sophistication of the economy has changed significantly since 1960, the value of the 1960 table for research work is questionable. In this study, a non-survey 1960 table was derived from available information and then compared to the full-survey table in order to determine the level of accuracy of the non-survey technique. Since the tests proved positive, the BBER used the technique to construct a non-survey 1972 table for the State.

METHOD

The basic method employed in this study centers around the use of location quotients for determining the adjustment to be made to the direct coefficients of the United States input-output table in order to produce a regional direct coefficient input-output table. The result is a non-survey input-output table of direct coefficients for the New Mexico economy of 1960. Consequently, the location quotients were those for the period 1960 while the national survey coefficients are from 1963. The method therefore makes the naive assumptions that the coefficients did not change between 1960 and 1963, and that on the average the techniques of production in New Mexico are similar to those in the United States, at least in the 1960-1963 period.

The objective of this paper is not to engage in a digression of the relative positive and negative aspects of the input-output technique itself, but it does seem in order to discuss the assumption that the techniques used in production are constant to a specific industry regardless of its geographic location or size. Basically, a survey-derived input-output table for a specific region should point out the various techniques used in production when that table is compared with a table compiled for any other region. We would expect some differences; for example, the use of labor as a quantity input to production would vary from region to region depending upon the alternative costs in the production of a product, recognizing the fact that the producer minimizes his cost and that the labor costs relative to the price of other inputs vary from region to region.

The non-survey technique employed in this study, however, cannot take the varying techniques of production under consideration because the process of adjustment does not account for them. In this way the non-survey table differs from the region-specific survey type model.

Although many other minor dissimilarities can be distinguished, one other major distinction in this method exists. This variation concerns an assumption that normally occurs, not in the building of the model but in its use. In employing an I-O model for deriving the impact of changes to a specific industry in terms of size or production levels, or for the addition or deletion of industries in an area, normally we make the assumption that a specific industry or firm buys input products from other firms in the area that appear to produce those needed products for the production of the buyer's products. In other words, under normal conditions, the input-output process is not refined to the degree needed to adjust for the absence of a specific product because the Standard Industrial Classification code listing encompasses that specific unit.

In the building of a survey-type input-output model this assumption is not needed, since the inputs are traced to domestic producers in the existing economy or the input is designated as an import. However, in the non-survey technique of building the input-output model, an assumption is also made that if the industry exists in the area, the product is bought in the area, and thus it is available. The location quotient does nothing more than adjust the level of purchasing of that specific input. Therefore, under normal conditions, it may be assumed that the non-survey technique employed in this study could slightly overestimate the purchasing of the required input-product from existing industries in the area by another

existing industry. This could possibly underestimate the importation of needed inputs by any one specific industry. On the other hand, since a firm is classified by the major product (or service) it produces, then some product identification is obscured through classification and the result is an underestimate of available products. The latter situation appears to be the lesser of the two-sided problem.

Turning to the specific method used in this study, the first matter to consider is that of the adjustment technique, specifically, the location-quotient derivation and its application to the U.S. table. Two types of location quotients were used in this study. The first is the traditional type, which is a comparison of the relative importance of an industry in a region with its relative importance in the Nation, by use of employment figures. Secondly, the output-location quotient accomplishes the same comparison; however, instead of employment, the dollar volume of output is used.

The following is a description of the location quotients employed.

LOCATION QUOTIENTS

Employment Location Quotient

In its simplest form the employment-location quotient is defined for the i th industry as:

$$ELQ = \frac{e_i/e}{E_i/E}$$

where: ELQ is defined as the Employment-Location Quotient;
 e_i is the regional (New Mexico) employment in the i th industry;
 e is the total employment in the region (New Mexico);
 E_i is the national (total) employment in the i th industry; and
 E is the total national employment (13, 14).

If the location quotient is equal to 1, we assume that the region is self-sufficient in that industry. That is, on the average, the region is producing its domestic needs specific to that industry. If the location quotient is less than 1, the region is probably not producing its domestic needs in relation to that industry, and therefore part of the industry-specific consumption of that region is necessarily imported. On the other hand, if the location quotient is more than one, we assume that the region is producing goods for export. Several basic qualifications are necessary in order for the location quotient to be a realistic tool.

One necessary assumption is that the consumption patterns for each region are analogous to those of the nation as a whole, and that all production in the United States is consumed domestically. We can easily see that if the consumption is not 100 percent domestic, then a location quotient for any specific industry which is equal to unity does not necessarily mean that that industry is just self-sufficient. It may in fact be a net exporter.

Moreover, if national consumption of a specific product warrants importation of that product, a location quotient greater than unity may be needed for an industry to be self-sufficient in the production of that specific product. However, if we assume that the consumption patterns are fairly equal from region to region, and that imports and exports are small relative to total production, then the location quotient concept is intuitively a logical tool for the adjustment process.

Output-Location Quotients

Basically, those deficiencies and positive aspects of the employment-location quotient hold true for the output-location quotient. The output-location quotient is defined as:

$$XLQ = \frac{x_i/x}{X_i/X}$$

where: XLQ is defined as the dollar output-location quotient;
 x_i is the dollar output of the i th industry in the region (New Mexico);
 x is the dollar output of all industry (Gross State Product) in the region (New Mexico);
 X_i is the dollar output nationally of the i th industry; and
 X is the total dollar output of all industry (Gross National Product) in the nation.

We should note at this point that the output-location quotient is a non-traditional location quotient. The use of the output-location quotient is necessary in this study simply because employment location quotients do not properly represent an adjustment factor for certain industries. This is true because of the incompleteness of data on employment in certain industries or the simple non-existence of certain types of data needed to make the employment-location quotient a workable tool for other industries (particularly agriculture).

Direct Coefficients

The objective of this study is to produce a table of direct coefficients for a region by adjusting the national technical direct coefficients from the 1963 national study. The U.S. study used in this research consists of 352 endogenous sectors plus 27 exogenous sectors including such things as household, inventory-evaluation adjustment, net inventory change and government expenditures in addition to net exports and imports (23).

Procedure for Adjustment

Theoretically, the use of location quotients to adjust the national input-output coefficients can be justified by the assumption that if an industry in an area is not of average size, then it cannot supply all of the

needs of other industries in terms of product inputs. The adjustment procedure using location quotients assumes that the selling industries are able to supply a product to the buying industries in relation to their size. Their size in the study is determined by both the industry's employment and output.

The location quotients, having once been computed, are used as adjustment factors on a row-by-row basis to the national table. Any location quotient which is greater than 1 indicates in the most basic terms that that industry is an exporting industry. That is, since it produces more, or employs more people than the average industry employs for the domestic location in which it is set, then the excess product is exported and it becomes a net exporting industry. For those industries which had a location quotient greater than 1, we assumed that they continued to buy input products in a similar fashion to that of the average industry across the United States; therefore, any upward adjustment in the direct coefficients on the national table would indicate that that specific industry is selling more of a product, percentage-wise, to a region-specific industry than that industry can use. This assumption, of course, would be unrealistic. Therefore, all location quotients which were greater than 1 were set to a constant factor of unity. This situation means that the selling industry, with a location quotient of unity, provides no more or no less than the products needed as inputs to other industries.

Data Limitations and Location-Quotient Computation

In trying to gather data to compute the needed location quotients for 352 endogenous sectors, the obvious conclusion is that the finer the breakout of the sub-industries of any major industry, the more limited the data. For example, excellent wage- and salary-employment statistics are available for a complete year at the two-digit SIC code level for all manufacturing industries. However, when the industries are disaggregated to a basic four-digit SIC code level, then the data becomes harder to obtain. Those employment data which are available at the four-digit SIC code level are published only once a year for the first quarter of the year. Therefore, when computing the employment location quotients, use of year-round data at the four-digit SIC code level was impossible, and only first-quarter information was used.

This situation could lead to a problem: the first quarter may not be representative of the employment in the industry, since (1) the industry may expand or contract throughout the year and the level in the first quarter is not the average for the year, and (2) many industries are beset with seasonal employment and the first quarter nationwide is normally the slowest quarter of the year. Therefore, employment in the first quarter in many cases would not be representative of the total year because of seasonal fluctuation.

To eliminate part of the problem of using first-quarter data, the 1960 first-quarter data could be averaged with the 1961 data to produce a figure which probably would be closer to the 1960 average than that produced by using the first-quarter data. However, since this procedure would involve averaging two quarters from the same time of the year, no adjustment would

be made for seasonal fluctuation. The effort in making such an averaging adjustment appeared to be a fruitless task since in computation of the location quotients by both methods, very little difference occurs in the results. This fact can be accounted for because a region in most cases would experience the same fluctuations in employment for any specific industry that the nation would in the very short run. Therefore, it was decided that the use of first-quarter data for 1960 would be as relevant to the situation as the average of the first quarters of 1960 and 1961. The employment-location quotients were therefore applied to all of the manufacturing sectors.

While it would have been preferable to use employment-location quotients for all sectors defined in the national table, such a plan was not possible considering the limitations of the data. For example, very little information is available on employment in the agricultural sector for the sub-industry categories listed on the national table. A figure for employment in all agriculture, of course, is available (24). However, when trying to locate employment in dairy farms, or for poultry and egg production, or in meat animal and miscellaneous livestock products, or in cotton, etc., the task is highly difficult if not impossible. Furthermore, if figures can be located, there is no guarantee that those figures are inclusive of the total employment in that industry, since many of the production units in the agricultural industry are nothing more than "ma and pa" operations, with employment of the proprietor rarely counted in the employment statistics at the sub-industry level. Therefore, after careful examination of the problems involved in trying to use employment-location quotients for the agricultural sector, a decision was made to use a non-traditional location quotient which we have called an output-location quotient (as explained in the foregoing section of this paper).

AGGREGATION OF THE NATIONAL TABLE

While the objective of this study is to produce a non-survey input-output table, the overall result of the study can be said to include a comparison of the non-survey table with a survey data table for New Mexico of 1960. The 1960 New Mexico table contained 42 endogenous sectors (2). In order to make such a comparison, the 352 endogenous sectors in the national table must be aggregated to the 42 sector level. Note that 292 of the 352 sectors are specific to manufacturing basically at the four-digit SIC code level. Therefore, the manufacturing portion of the table makes up nearly 83 percent of the total sectors defined in the national table. While aggregation is necessary due to the objective of the study, it should also be desirable for any region which could be defined below the national level because a high probability exists that something less than the 292 defined manufacturing sectors exist in that region. This premise is particularly true in New Mexico with its small manufacturing sector that comprised approximately 7 percent of total wage and salary employment in 1960 (33).

The aggregation process could have been accomplished using several means. First, a simple averaging of the coefficients for each by adding together each of the national sectors into its respective New Mexico sector, and then dividing by the number of sectors included. Obviously, this is a naive approach. Secondly, the sectors could have been averaged by weighting them as to their employment, which was apparently done in previous research

(Shaffer, etc.) using the location-quotient method (13,14). However, a third method exists which appeared to be better. Estimated output for each of the identified national sectors was computed and these sectors were weighted by their output. Obviously, one of the effects of this method would be the same as using employment as a weight--that is, to give the larger industries in the state more influence in the determination of the direct coefficients than the smaller industries when two or more industries of unequal size are aggregated together. However, the third method did something more than the aggregation by employment size was able to accomplish. The aggregation by volume of output accounted for varying levels of productivity which exist from industry to industry. For those industries which had been adjusted by output location quotients the output figures already existed for the aggregation process.

For other industries which had been adjusted by employment-location quotients, estimating output in 1960 was necessary. Luckily, output data for 1958 and 1963 existed from the various detailed Censuses of Manufacturing, Business, etc. for those industries which had been adjusted by employment-location quotients (26). Therefore, the procedure was to arrive at an estimated level of output per employee (productivity) using a weighted average for the two data years. That output per employee is applied to the number of employees to get an estimated total output for that industry or sub-industry in 1960. Where possible, the level of productivity was specific to that State. However, some sub-industries were so small that no information on a state level was given in the various censuses. Therefore, productivity at the regional or national level had to be used.

The question arose as to how productivity at the national level compares with productivity for the individual states. In order to determine whether or not national productivity would be valid measure of local productivity, a random sample of five industries was chosen and an analysis was completed with from 10 to 20 observations, by state. The results of this analysis showed that the variation in productivity was negligible in the five industries among the states tested. Therefore, based on this random selection of five industries, we concluded that national productivity was a valid alternative to statewide productivity when necessary for use in computing estimated output.

COMPARISON

In this portion of the study, a description of the comparison between the 1960 survey-based table and the 1960 non-survey table is given. This comparison was performed with 39 and not 42 columns. Three sectors from the survey-based 1960 New Mexico table had to be deleted as they were defined differently in the non-survey table. A comparison test was performed that was similar to the test described by Shaffer and Chu in their article on non-survey based input-output techniques (14).

To test the accuracy of the non-survey table, x^2 was computed for each column in the direct requirements table, taking as the true values the technical coefficients from the survey-based 1960 New Mexico Input-Output Table published by the UNM Bureau of Business Research. Two comparisons were made between the survey-based table and the direct requirements table with function

weights: (1) a non-survey table aggregated without the use of location quotients to the 1960 survey-based table; and (2) a direct requirements table with both function weights and location quotients to the 1960 survey-based table. The null hypothesis was that the non-survey technique would yield direct requirements coefficients which were the same as those in the survey-based table. An evaluation was made of the results of the tests at the 95 percent level with 38 degrees of freedom. The results of the tests were as follows: for the direct requirements table without location quotients the χ^2 statistic in 22 of 39 columns was in the rejection interval,¹ indicating that function weights alone are not enough to produce reasonable accuracy. However, for the table with the location quotients, the χ^2 statistic was in the rejection interval in only 8 of the 39 columns. This figure indicates that the location-quotient method produces results that are reasonably close to the 1960 survey value.

CONCLUSION

In the introduction we stated that two questions were to be answered in this study: (1) can the table be constructed with available data and techniques? and (2) how does the table compare with a full survey-based table?

First, a non-survey based table obviously can be constructed in the manner by which it was accomplished in this project. The methodology in this study was considerably more time consuming and difficult than the location-quotients adjustment procedure described in the recent literature (9, 11, 13, 14). The procedure of adjusting coefficients previous to aggregation should be more accurate. Unfortunately, the study cannot attest to a difference in accuracy; however, obtaining data for the 352 endogenous sectors listed in the national input-output tables of 1963 and 1967 is more detailed and difficult than locating data for the more highly aggregated sectors, such as those appearing in the New Mexico and Washington state tables (1, 3, 4).

The advantage of the lower-cost non-survey technique is significant. Compared with a survey-based table, the total time involved in producing a non-survey based table is minimal. (A 1972 New Mexico non-survey table was produced in five weeks using this technique. The cost was less than \$5,000).

¹ $\chi^2_{.05}$ with 38 d.f. was computed according to the formula:

$$\chi^2_{\alpha} = n \left(1 - \frac{2}{9n} + Z_{\alpha} \frac{2}{9n} \right)^3 \text{ where } n = 38 \text{ and } Z_{\alpha} = 1.645.$$

(Z_{α} is the normal deviate at the 95 percent level.)

Thus $\chi^2_{.05} = 53.380$.

<u>Column Number</u>	<u>Industry</u>	<u>X² Value Without Location Quotient Adjustment</u>	<u>X² Value With Location Quotient Adjustment</u>
1	Meat Animals	1837.86908	1836.52435
2	Dairy Products	3.91990	1.98851
3	Feed Grains	121.61327	110.09386
4	Cotton	68.22235	63.40295
5	Other Farm Products	79.11645	66.52820
6	Agricultural Services	1500.84171	535.16665
7	Copper Mining	156.29900	18.90447
8	Non-ferrous Ores Mining	126.60604	11.98700
9	Crude Oil and Petroleum	19.60852	11.60208
10	New Construction, Other	569.80825	70.58260
11	Chemical Mining	9.83117	0.80598
12	Coal, Stone & Clay Mining & Quarrying	157.44106	15.11602
13	Meat Products, Processed	334.29984	54.75327
14	Dairy Products, Processed	64.18916	0.17410
15	Grain Mill & Baked Products	466.76550	8.19718
16	Miscellaneous Food Products	107.07734	3.11619
17	Lumber, Wood & Furniture	56.70250	9.85470
18	Printing & Publishing	1155.28348	11.25779
19	Chemicals, Plastics & Rubber	94.98391	11.31261
20	Petroleum Refining	29.28434	0.92766
21	Concrete & Stone Products	10.50268	2.07352
22	Electrical Equipment & Machinery	95.06541	0.28200
23	Fabricated Metal Products	613.84833	0.25926
24	Miscellaneous Manufacturing	153.26054	0.92913
25	Railroads	20.06416	3.00616
26	Other Transportation	7.69775	0.51413
27	Gas & Oil Pipelines	17.40511	15.08370
28	Communications	11.00637	6.57453
29	Electric & Water Utilities	39.57436	2.81252
30	Gas Utilities	3321.07094	3320.87176
31	Wholesale Trade	21.68048	4.12142
32	Retail Trade	4.84526	0.13118
33	Finance & Insurance	2.77826	0.67102
34	Real Estate	4.20676	1.98422
35	Hotels & Motels	3.75628	0.28428
36	Personal Services	69.65323	1.18209
37	Business Services	1.58041	0.22846
38	Auto Repair	340.81264	1.46602
39	Medical & Educational	28.18200	0.15089

The comparison of the location-quotient adjusted non-survey based table with the full survey table showed that some columns were significantly different. However, analysis of the columns which varied significantly in the two tables indicates that certain major sectors accounted for a large portion of that variation. For example, five of the six sub-sectors in agriculture showed significant variation, and one of the six sub-sectors of the mining industry varied significantly. Both of these major sectors were adjusted by output-location quotients and since the mining sector fared well in the test there is no reason to believe that the output-location quotient adjustment accounted for the variation in agriculture. Therefore, concerning agriculture and mining, six of the twelve columns varied significantly between the two tables. These columns account for three quarters of the total columns which had X^2 in the unacceptable range.

In manufacturing, only one column showed significant variation between the two tables. This column was meat packing (closely related to the agricultural sector). This X^2 (54.75) could be said to be in a marginal range of acceptance. The gas-utilities column had the largest X^2 of any of the columns. The variation in the gas-utilities column could be expected since the gas utilities in New Mexico are different in activity compared with the national average. The New Mexico gas utilities are both producers and distributors and therefore the national coefficients should not and do not reflect this vertical integration.

Considering these results, we believe that the non-survey based technique used to build a 1960 table for New Mexico is an acceptable procedure and gives valid results in a majority of the columns. For those columns that have X^2 significantly different from the survey-based 1960 table, most problems occur in the one sector (agriculture) for which data is very limited.

REFERENCES

1. Association of Western Railways, Railroad Facts, 1961 (Chicago: Association of Western Railways, 1961).
2. Blumenfeld, Arthur A., et al, "A Preview of the Input-Output Study," New Mexico Business (October, 1965).
3. Bourque, Philip J., "Forecasting with Input-Output," Business Studies, No. 5 (Seattle: University of Washington, 1971).
4. Bourque, Philip J., et al, "The Washington Economy: An Input-Output Study," Business Studies, No. 3 (Seattle: University of Washington, 1967).
5. Eastern Railroad Presidents Conference, Yearbook of Railroad Information, 1961 (New Jersey, 1961).
6. Harmston, Floyd K., and Lunc, Richard E., Application of an Input-Output Framework to a Community Economic System (Columbia, Missouri: University of Missouri Press, 1967).
7. Isard, Walter, Methods of Regional Analysis: An Introduction to Regional Science (Boston, Massachusetts: The MIT Press, 1960).
8. McPhee, Gordon, Local Economic Base Studies Using Input-Output Analysis (U.S. Department of Commerce, 1969).
9. McMenamin, David, and Haring, Joseph, "An Appraisal of Nonsurvey Techniques for Estimating Regional Input-Output Models," J Regional Science (August, 1974).
10. Miernyk, William H., A Primer of Input-Output Economics (Boston: Northeastern University, 1957).
11. Morrison, W. I., and Smith, P., "Nonsurvey Input-Output Techniques at the Small Area Level: An Evaluation," J Regional Science (April, 1974).
12. New Mexico Department of Agriculture, New Mexico Agricultural Statistics, Vol. 1 (Las Cruces, New Mexico: New Mexico State University, 1966).
13. Schaffer, William A., "Estimating Regional Input-Output Coefficients," Review of Regional Studies (Volume 2, 1972).
14. Schaffer, William A., and Chu, Kong, "Nonsurvey Techniques for Constructing Regional Interindustry Models," The Regional Science Association Papers (Volume 23).
15. The United States Bureau of the Budget, Standard Industrial Classification Manual, 1957 (Washington, D. C.: U.S. Government Printing Office, 1957).
16. The United States Bureau of the Budget, Standard Industrial Classification Manual, 1967 (Washington, D.C.: U.S. Government Printing Office, 1967).

17. The United States Bureau of Mines, Minerals Yearbook, 1960, Vols. 1-3 (Washington, D. C.: U.S. Government Printing Office, 1960).
18. The United States Department of Agriculture, Agricultural Statistics, 1960 (Washington, D.C.: U.S. Government Printing Office, 1960).
19. The United States Department of Agriculture, Agricultural Statistics, 1961 (Washington, D.C.: U.S. Government Printing Office, 1961).
20. The United States Department of Agriculture, Agricultural Statistics, 1963 (Washington, D.C.: U.S. Government Printing Office, 1963).
21. The United States Department of Agriculture, Seeds, The Yearbook of Agriculture, 1961 (Washington, D.C.: U.S. Government Printing Office, 1961).
22. The United States Department of Commerce, Bureau of the Census, County Business Patterns, 1962 (Washington, D. C.: U.S. Government Printing Office, 1963).
23. The United States Department of Commerce, Input-Output Structure of the U.S. Economy: 1963, Vols. 1 - 3 (Washington, D.C.: U.S. Government Printing Office, 1969).
24. The United States Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, 1961 (Washington, D.C.: U.S. Government Printing Office, 1961).
25. The United States Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, 1962 (Washington, D.C.: U.S. Government Printing Office, 1962).
26. The United States Department of Commerce, Bureau of the Census, 1963 Census of Business, various volumes (Washington, D.C.: U.S. Government Printing Office, 1966).
27. The United States Department of Commerce, Bureau of the Census, 1958 Census of Manufactures, Vols. 1 - 3 (Washington, D.C.: U.S. Government Printing Office, 1961).
28. The United States Department of Commerce, Bureau of the Census, 1963 Census of Manufactures, various volumes (Washington, D.C.: U.S. Government Printing Office, 1965).
29. The United States Department of Commerce, Bureau of the Census, 1963 Census of Mineral Industries, various volumes (Washington, D.C.: U.S. Government Printing Office, 1963).
30. The United States Department of Commerce, Bureau of the Census, United States Census of Agriculture, 1959, various volumes (Washington, D.C.: U.S. Government Printing Office, 1962).
31. The United States Department of Commerce, Bureau of the Census, United States Census of Agriculture, 1964, various volumes (Washington, D.C.: U.S. Government Printing Office, 1967).

32. The United States Department of Labor, Bureau of Labor Statistics, Employment and Earnings, United States, 1909-71 (Washington, D.C.: U.S. Government Printing Office, 1972).
33. The United States Department of Labor, Employment and Wages, 1960 (Washington, D.C.: U.S. Government Printing Office, 1960).
34. Tiebout, Charles M., The Community Economic Base Study (New York: Committee for Economic Development, 1962).
35. F. W. Dodge Division, McGraw-Hill Information Systems Co., "Region VIII Bulletin," Dodge Construction Potentials Bulletins, appropriate years.

APPENDIX B-1

With Location Quotient
Adjustment

NEW MEXICO INPUT-OUTPUT MODEL, 1960
TECHNICAL COEFFICIENTS: DIRECT REQUIREMENTS PER DOLLAR OF OUTPUT

		INDUSTRY PURCHASING											
		1	2	3	4	40	41	42	*** ROW SUMS ***				

INDUSTRY A-77	MEAT ANIMALS	1	0.27096	0.00300	0.05196	0.0441	0.00000	0.00000	0.00000	1	0.94268		
	DAIRY PRODUCE	2	0.00295	0.00900	0.01007	0.006	0.00000	0.00000	0.00000	2	0.34722		
	FEED GRAINS	3	0.20623	0.23408	0.02256	0.001	0.0000	0.00010	0.00000	3	0.66950		
	COTTON	4	0.00000	0.00000	0.00000	0.00	0.0000	0.00000	0.00000	4	0.23377		
	OTHER FARM P	5	0.00355	0.00002	0.00000	0.001	0.000	0.00379	0.00000	5	0.19805		
	AGRICULTURAL	6	0.00000	0.03689	0.02572	0.115	0.000	0.00004	0.00000	6	0.21494		
	COPPER MININ	7	0.00000	0.00000	0.00000	0.000	0.0000	0.00000	0.00000	7	0.29950		
	NONFERRALS	8	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	8	0.16612		
	CRUDE OIL	9	0.00300	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	9	0.67426		
	NEW CONSTRUCT	10	0.00000	0.00000	0.00000	0.0000	0.00000	0.00000	0.00000	10	0.00000		
	CHEMICAL MIN	11	0.00300	0.00000	0.00173	0.000	0.0000	0.00000	0.00000	11	0.07378		
	COAL, STONE	12	0.00000	0.00014	0.00261	0.001	0.0000	0.00000	0.00000	12	0.13352		
	MEAT PRODUCE	13	0.00000	0.00000	0.00000	0.001	0.0000	0.00000	0.00000	13	0.06155		
	DAIRY PRODUCE	14	0.00000	0.00000	0.00000	0.00	0.0000	0.00000	0.00000	14	0.12100		
	GRAIN MILL	15	0.05223	0.16519	0.00000	0.00	0.0000	0.00000	0.00000	15	0.34171		
	MISC. FEED P	16	0.00613	0.00000	0.00000	0.00	0.0000	0.00000	0.00000	16	0.06534		
	LUMBER, WOOD	17	0.00000	0.00000	0.00000	0.00	0.0000	0.00000	0.00000	17	0.26494		
	PRINTING & P	18	0.00001	0.00001	0.00001	0.00	0.0000	0.00000	0.00000	18	0.02796		
	CHEMICALS, P	19	0.00121	0.00116	0.01625	0.010	0.0000	0.00023	0.00022	19	0.17098		
	PETROLEUM RE	20	0.00379	0.00035	0.03232	0.020	0.00375	0.01244	0.03462	20	0.39907		
	CONCRETE & S	21	0.00000	0.00000	0.00000	0.0000	0.00000	0.00000	0.00000	21	0.26496		
	ELECTRICAL	22	0.00007	0.00009	0.00006	0.0000	0.00006	0.00002	0.00002	22	0.11071		
	FABRICATED M	23	0.00000	0.00001	0.00002	0.0000	0.0000	0.00000	0.00000	23	0.06663		
	MISC. MANUFA	24	0.00044	0.00025	0.00032	0.0003	0.0000	0.00003	0.00000	24	0.09434		
	RAILROADS	25	0.00495	0.00716	0.00545	0.0034	0.00	0.01120	0.00055	25	0.29136		
	OTHER TRANSP	26	0.01225	0.02453	0.00485	0.0034	0.00	0.01913	0.00070	26	0.40760		
	GAS & OIL PI	27	0.00010	0.00017	0.00006	0.0000	0.0000	0.00014	0.00009	27	0.04018		
	COMMUNICATIO	28	0.00161	0.00269	0.00311	0.0021	0.1182	0.00272	0.01021	28	0.26010		
	ELECTRIC & W	29	0.00240	0.00471	0.00452	0.0042	0.01233	0.00729	0.03289	29	0.43889		
	GAS UTILITIE	30	0.00000	0.00009	0.00000	0.0000	0.00296	0.00040	0.00309	30	0.51581		
	WHOLESALE TR	31	0.01563	0.01606	0.01339	0.0097	0.0480	0.02921	0.00509	31	0.58733		
	RETAIL TRADE	32	0.00718	0.01208	0.01322	0.013	0.1506	0.03863	0.00786	32	0.32881		
	FINANCE & IN	33	0.00332	0.00385	0.00464	0.009	0.0438	0.00362	0.00286	33	0.37606		
	REAL ESTATE	34	0.01030	0.01234	0.00643	0.121	0.5412	0.00475	0.10525	34	1.43631		
	HOTELS & MOT	35	0.00000	0.00000	0.00000	0.001	0.000	0.00000	0.00000	35	0.00432		
	PERSONAL SER	36	0.00000	0.00000	0.00000	0.001	0.000	0.00000	0.00000	36	0.19501		
	BUSINESS SER	37	0.00566	0.00050	0.00371	0.02	0.1606	0.00694	0.01607	37	0.53671		
	AUTO REPAIR	38	0.00273	0.00355	0.00591	0.005	0.0059	0.00363	0.00403	38	0.18152		
	MEDICAL & ED	39	0.00181	0.00408	0.00000	0.000	0.0000	0.00000	0.00491	39	0.02043		
	MISC. PROFES	40	0.00127	0.00145	0.00156	0.0017	0.06982	0.04099	0.01416	40	0.33638		
	NEW CONSTRUCT	41	0.00666	0.00933	0.01467	0.0141	0.0046	0.00026	0.01110	41	0.55663		
	NONPROFIT OR	42	0.00027	0.00503	0.00038	0.0000	0.0074	0.00086	0.00067	42	0.04476		
*** COLUMN SUMS ***			0.62377	0.56049	0.36507	0.426	0.074	0.30309	0.26408				

Complete tables will be furnished upon request to the Bureau of Business and Economic Research, University of New Mexico, Albuquerque, NM 87131.

APPENDIX B-2

Without Location Quotient
AdjustmentNEW MEXICO INPUT-OUTPUT MODEL, 1960
TECHNICAL COEFFICIENTS: DIRECT REQUIREMENTS PER DOLLAR OF OUTPUT

Adjustment		INDUSTRY PURCHASING								**** ROW SUMS ****	
		1	2	3	4	40	41	42			
S E C T O R S	MEAT ANIMALS	1	0.27095	0.00000	0.05195	0.04419	0.00000	0.00000	0.00000	1	0.94268
	DAIRY PRODUCT	2	0.00521	0.00000	0.01934	0.0124	0.00000	0.00000	0.00000	2	0.69955
	FEED GRAINS	3	0.00783	0.00000	0.03148	0.00000	0.00000	0.00015	0.00000	3	0.93440
	COTTON	4	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	4	0.23377
	OTHER FARM P	5	0.00425	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	5	0.27395
	AGRICULTURAL	6	0.00000	0.00000	0.02692	0.11	0.0000	0.00004	0.00000	6	0.21494
	COMMER MININ	7	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	7	0.30507
	NONFARMUS D	8	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	8	0.16612
	CLUDE OIL E	9	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	9	0.67476
	NEW CONSTRUCT	10	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	10	0.00000
	CHEMICAL MIN	11	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	11	0.07378
	COAL STONE	12	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	12	0.26421
	MEAT PRODUCT	13	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	13	0.15089
	DAIRY PRODUCT	14	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	14	0.18957
	GRAIN MILL E	15	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	15	0.47341
	MISC. FOOD P	16	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	16	0.43149
	LUMBER, SCUD	17	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	17	1.01735
	PRINTING & P	18	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	18	0.21111
	CHEMICALS, P	19	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	19	0.09618
	PETROLEUM RE	20	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	20	0.54865
	CONCRETE & S	21	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	21	1.07423
	ELECTRICAL E	22	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	22	1.23212
	FABRICATED M	23	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	23	0.48542
	MISC. MANUFA	24	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	24	0.59791
	RAILROADS	25	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	25	0.29136
	OTHER TRANSP	26	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	26	0.58462
	GAS & OIL RE	27	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	27	0.04018
	COMMUNICATION	28	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	28	0.26010
	ELECTRIC & W	29	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	29	0.48629
	GAS UTILITY	30	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	30	0.51581
	WHOLESALE TR	31	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	31	0.03761
	RETAIL TRADE	32	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	32	0.32881
	FINANCE & IN	33	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	33	0.57405
	REAL ESTATE	34	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	34	1.43631
	HOTELS & MOT	35	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	35	0.00432
	PERSONAL SER	36	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	36	0.19922
	BUSINESS SER	37	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	37	0.75762
	AUTO REPAIR	38	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	38	0.18152
	MEDICAL & ED	39	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	39	0.03568
	MISC. PROFES	40	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	40	0.33638
	NEW CONSTRUCT	41	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	41	0.55663
	NONPROFIT OR	42	0.00000	0.00000	0.00000	0.0000	0.0000	0.00000	0.00000	42	0.04641
*** COLUMN SUMS ***		0.74399	0.72111	0.48692	0.51695	0.22892	0.50791	0.29752			

Adjustment

SECTORS

A-78

Complete tables will be furnished upon request to the Bureau of Business and Economic Research, University of New Mexico, Albuquerque, NM 87131.

FLOW CHART FOR CREATING A NON-SURVEY REGIONAL INPUT-OUTPUT MODEL

DISTRIBUTION

U.S. Department of Energy, Headquarters
Office of Nuclear Waste Management
Washington, DC 20545

Eugene F. Beckett, Project Coordinator (WIPP) (5)
Colin A. Heath, Director, Division of Waste Isolation
Randal S. Scott

U.S. Department of Energy, Albuquerque Operations
P.O. Box 5400
Albuquerque, NM 87185

J. M. McGough, WPO (3)
G. Dennis, Director, Public Affairs Division
S. C. Taylor, C&TI Division

U.S. Department of Energy
Carlsbad WIPP Project Office
Room 113, Federal Building
Carlsbad, NM 88220

U.S. Department of Energy
c/o Battelle Office of Nuclear
Waste Isolation
505 King Avenue
Columbus, OH 43201
Jeff O. Neff

Battelle Memorial Institute
Office of Nuclear Waste Isolation
505 King Avenue
Columbus, OH 43201
Neil Carter, General Manager (3)

Westinghouse Electric Corporation
P.O. Box 40039
Albuquerque, NM 87196
R. C. Mairson (3)

Hobbs Public Library
509 N. Ship St.
Hobbs, NM 88248
Ms. Marcia Lewis, Librarian

National Academy of Sciences, WIPP Panel

Frank L. Parker, Chairman
Department of Environmental and
Water Resources Engineering
Vanderbilt University
Nashville, TN 37235

Konrad B. Krauskopf, Vice Chairman
Department of Geology
Stanford University
Stanford, CA 94305

Neville G. W. Cook, Member
Dept. of Material Sciences and Engineering
University of California at Berkeley
Heart Mining Building, #320
Berkeley, CA 94720

Merril Eisenbud, Member
Inst. of Environmental Medicine
New York University Medical Center
Box 817
Tuxedo, NY 10987

Fred M. Ernsberger, Member
Glass Research Center
PPG Industries, Inc.
Box 11472
Pittsburgh, PA 15238

Roger Kasperson, Member
Center for Technology, Environment and Development
Clark University
Worcester, MA 01610

Richard R. Parizek, Member
Department of Hydrogeology
Pennsylvania State University
University Park, PA 16802

Thomas H. Pigford, Member
Department of Nuclear Engineering
University of California
Berkeley, CA 94720

Roger W. Staehle, Member
Dean, Institute of Technology
University of Minnesota
Lind Hall
Minneapolis, MN 55455

John W. Winchester, Member
Department of Oceanography
Florida State University
Tallahassee, FL 32306

D'Arcy A. Shock, Consultant
233 Virginia
Ponca City, OK 74601

John T. Holloway, Executive Secretary
2101 Constitution Avenue, NW
Washington, DC 20418

WIPP Public Reading Room
Atomic Museum, Kirtland East AFB
Albuquerque, NM 87185

Attn: Ms. Gwynn Schreiner

WIPP Public Reading Room
Carlsbad Municipal Library
101 S. Hallagueno St.
Carlsbad, NM 88220

Attn: Lee Hubbard, Head Librarian

Thomas Brannigan Library
106 W. Hadley St.
Las Cruces, NM 88001

Attn: Don Dresp, Head Librarian

Roswell Public Library
301 N. Pennsylvania Avenue
Roswell, NM 88201

Attn: Ms. Nancy Langston

New Mexico Advisory Committee on WIPP
NMIMT Graduate Office
Socorro, NM 87801

Marvin H. Wilkening, Chairman (2)

State of New Mexico
Environmental Evaluation Group
320 Marcy Street
P.O. Box 968
Santa Fe, NM 87503

Robert H. Neill, Director (2)

NM Department of Energy & Minerals
P.O. Box 2770
Santa Fe, NM 87501

Larry Kehoe, Secretary
Kasey LaPlante, Librarian

USGS, Water Resources Division
P. O. Box 26659
Albuquerque, NM 87125

J. W. Mercer, J. McLean (2)

USGS, Conservation Division
Office of Mining & Resource Evaluation
P. O. Box 506
Carlsbad, NM 88220

C. B. John

USGS, Conservation Division
P. O. Box 1857
Roswell, NM 88201

W. Melton

New Mexico Bureau of Mines and Mineral Resources
Socorro, NM 87801

F. E. Kottlowski, Director

Sandia Internal:

3141 T. L. Werner (5)
3151 W. L. Garner, For: DOE/TIC (Unlimited Release) (3)
3154-3 R. P. Campbell, For: DOE/TIC (25)
4500 E. H. Beckner
4510 W. D. Weart
4511 D. W. Powers
4512 T. O. Hunter
4514 M. L. Merritt (10)
4540 M. L. Kramm
4542 Sandia WIPP Central Files (2)

J. E. Magruder, Sandia Carlsbad Representative
401 No. Canal Street
Carlsbad, NM 88220

Larry Adcock and Associates
3010 Monte Vista NE, Suite 202
Albuquerque, NM 87106

Larry Adock (30)
for distribution to
Claude Tabor, Carlsbad City Manager
Ken Gleason, Hobbs Assistant City Manager
Miranda Darcy, Loving Mayor
Hart Greenwood, Eddy County Commission Chairman
Leon Faris, Lea County Manager
James Thompson, NM Employment Security Division
Ronald Cummings, UNM Economics Department