



The Socioeconomic Impacts of THEMAC Resources Group Ltd. Copper Flat Mine Project in Sierra County, New Mexico

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Table of Contents

Section	Title	Page
	Table of Contents	i
	List of Tables	ii
	List of Figures	iii
	List of Maps	iii
	Definitions Used in the Study	iv
	Executive Summary	v
1.0	Introduction	1
2.0	The Copper Industry	2
2.1	World Trends	2
2.2	United States Trends	5
2.3	New Mexico Trends	8
3.0	Sierra County Economic and Demographic Profile	9
3.1	Demography: Size and Change in Population	9
3.2	Components of Population Change 2010-2011	11
3.3	Age and Sex Distribution	12
3.4	Population Projections	13
3.5	Race and Ethnicity	14
3.6	Educational Characteristics	15
3.7	Housing Characteristics	17
3.8	Income and Poverty	17
3.9	Labor Force and Employment	18
3.10	The Structure of Industry in Sierra County	19
3.11	Summary	23
3.12	About the Data	23
4.0	Economic Impacts of NMCC Copper Flat Mine Project	25
4.1	Construction Impacts	26
4.2	Operational Impacts	30
5.0	Copper and Taxes in New Mexico	32
5.1	Direct Taxes: Taxable Value, Rates and Amounts	32
5.2	Taxes Based on Labor Income	35
5.2.1	GRT, PIT, CIT and Compensating Taxes from Construction	36
5.2.2	GRT, PIT, and CIT From Operations	37
5.2.3	Tax Distributions to Local Government Units	37
6.0	Conclusions	38
	Appendix A: The Methods of Economic Impact Analysis	39
	Appendix B: Direct, Indirect and Induced Impacts by Year	44
	Appendix C: Statutory References for Valuation under the Severance Tax, Processors Tax and Property Tax	54
	Appendix D: Revenue Estimation Methodology: Effective Tax Rates	59
	Appendix E: About Arrowhead Center	61

List of Tables

Table	Title	Page
ES2.1	Impact of Construction and Capital Expenditures - 2014	v
ES2.2	Total Impacts by Year on Sierra County From Operational Expenditures	vi
ES2.3	Total Impacts by Year on the Rest of the State From Operational Expenditures in Sierra County	vi
ES3.1	Severance Taxes, Processor's Tax, and Property Tax by Year	vii
ES3.2	Gross Receipts Tax, Personal Income Tax, Corporate Income Tax and Compensating Tax by Year Due to Construction and Capital Expenditures and Operating Expenditures	viii
2.1.1	World Copper Production: 2007-2011	4
2.1.2	Copper Prices by Year	5
2.2.1	U.S. Copper Production, Imports and Exports: 2000-2011	7
3.1.1	Population and Percent Change in Population in the United States, New Mexico and Sierra County,1950-2010	10
3.2.1	Components of Population Change, Sierra County, New Mexico 2010-2011	11
3.4.1	New Mexico and Sierra County Population Projections	14
3.5.1	Race and Ethnicity in the United States, New Mexico and Sierra County	14
3.6.2	Educational Attainment of the Population 25 Years and Older: U.S., New Mexico and Sierra County	16
3.7.1	Selected Housing Characteristics in the U.S., New Mexico and Sierra County	17
3.8.1	Selected Income and Poverty Data U.S., New Mexico and Sierra County	18
3.9.1	Employment Status of the Population 16 Years and Older	18
3.10.1	Sierra County Employment by Sector, 2009	20
3.10.2	Sierra County Quarterly Business Counts	22
4.1.1	Impact of Capital Expenditures – Sierra County - 2014	26
4.1.2	Top Ten Sectors Affected by Construction Expenditures in Sierra County	27
4.1.3	Impact of Capital Expenditures – 2014 On the Rest of the State From Expenditures in Sierra County	27
4.1.4	Capital Expenditures Impact- Rest of State - 2014	28
4.1.5	Capital Expenditures Impact -2014 On Sierra County from Expenditures in the Rest of the State	28
4.1.6	Total Impacts by Year on Rest of State From Capital Expenditures in the Rest of State	29
4.1.7	Total Impacts by Year on Sierra County From Capital Expenditures in the Rest of State	29
4.2.1	Total Impacts by Year on Sierra County from Operational Expenditures	30
4.2.2	To Ten Sectors Affected by Operational Expenditures in Sierra County	31
4.2.3	Total Impacts by Year on the Rest of State from Operational Expenditures in Sierra County	31
5.1.1	Statutory Tax Rates	33
5.1.2	Severance Taxes: Gross Value Definitions for Minerals	33
5.1.3	Metal Prices	34
5.1.4	Severance Taxes, Processor’s Tax, and Property Tax by Year	35
5.2.1.1	Tax Revenues from Construction and Capital Expenditures	36
5.2.2.1	Tax Revenues from Operational Expenditures	37
5.2.3.1	Distribution of GRT to State, Other Counties and Sierra County	38

List of Figures

Figure	Title	Page
2.1.1	World Copper Production	2
2.1.2	Major Copper Producers	3
2.1.3	Copper Prices 1993-2011	4
2.2.1	U.S. Copper Production: 1930-2011	6
2.2.2	U.S. Production, Imports, and Exports	7
2.3.1	New Mexico Copper Production: 1980 to 2009	8
3.1.1	Percent Change in Population by Decade: Sierra County, New Mexico, United States	10
3.3.1	Population Pyramid Sierra County, New Mexico 2010	12
3.3.2	Population Pyramid New Mexico, 2010	13
3.6.1	Educational Attainment of Population 25 Years and Older: U.S. and Sierra County	15
3.9.2	Unemployment Rate in Sierra County, New Mexico and United States	19

List of Maps

Map 1	New Mexico Map Indicating Sierra County	9
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Definitions Used in the Study

Economic Impact Analysis: Economic impact analysis is an attempt to measure the net overall change in economic activity in a given geographic area that results from a change in economic activity in that area.

RIMS II, REMI, IMPLAN: Commonly used modeling systems to perform economic impact analysis. All three modeling systems are based on the national input-output model produced by the Bureau of Economic Analysis (BEA). The national model is scaled to state and county areas by the providers of the models. The RIMS II (regional input-output modeling system) system is produced by the U.S. Department of Commerce, Bureau of Economic Analysis (<http://www.bea.gov/regional/rims/index.cfm>). The REMI models are privately produced and customized to user specified geography by REMI (Regional Economic Models), Inc. (<http://www.remi.com/>). The IMPLAN model was originally developed for the U.S. Forest Service but for many years it has been maintained and sold by the Minnesota Implan Group, Inc. (<http://www.implan.com/>). The model used to produce the estimates in this report is IMPLAN PRO Version 3.

Output: Output is measured in dollars and corresponds to gross sales (includes both final and intermediate goods and services). Intermediate goods and services are used to produce other goods and services.

Value Added: A total sales measure excluding intermediate goods and services. Value added can be thought of as the local or regional counterpart to Gross Domestic Product (GDP).

Labor Income: Labor compensation measured in dollars consisting of wages and salaries including benefits and proprietors income.

Employment: Employment is measured in terms of numbers of job generated for a year. Jobs refer to both full and part-time employment.

Direct Effects: A direct effect is a result of the initial change in economic activity, i.e., an increase in spending (from outside the area considered) in a particular industry.

Indirect Effects: Indirect effects are the impact of local businesses buying goods and services from other local businesses.

Induced Effects: Induced effects result from the spending on the part of individuals who receive wages and salaries.

**The Socioeconomic Impacts of THEMAC Resources Group Ltd. Copper Flat Mine Project
in Sierra County, New Mexico**

Executive Summary

ES1 Introduction

The New Mexico Copper Corporation (NMCC), wholly owned by THEMAC Resources Group Limited (THEMAC), proposes to reopen a copper mine and processing facility near Hillsboro, NM. The proposed Project would consist of an open pit mine, flotation mill, tailings impoundment, waste rock disposal areas, a low-grade ore stockpile, and ancillary facilities. As a part of the permitting process, NMCC has commissioned Arrowhead Center, Inc. of New Mexico State University to conduct a socioeconomic impact study of the proposed mine.

Construction activities are planned for 2014. The expenditures include spending on construction of all administration and processing buildings and mine equipment. Total expenditures for construction and mine equipment are estimated to be \$300 million.

The projected life of the mine is eleven years. While some mining may take place in 2014, full operation will start in 2015 and end in 2025. In 2025, some production will occur, rehabilitation of the site will take place and the mine is scheduled to close. Average annual operating expenses over the eleven years are just over \$76 million.

ES2 Economic Impact

Table ES2.1 presents total impacts of construction and capital expenditures on Sierra County and on the State of New Mexico for 2014. All impacts are in 2012 dollars. During the construction period a total of 1,352 jobs (full and part time), \$55.6 million in labor income and \$79.6 million in value added (a measure of the change in value of goods produced) will be generated. Additional capital expenditures are made in operating years to replace capital equipment. The impacts are listed by year in the main report.

Table ES2.1

Impact of Construction and Capital Expenditures - 2014			
	Employment	Labor Income	Value Added
Sierra County	181.5	\$4,939,660	\$7,375,005
New Mexico	1,170.2	\$50,707,349	\$72,239,525
Total	1,351.7	\$55,647,009	\$79,614,530

Calculations by Authors Using IMPLAN PRO Version 3

Table ES2.2 presents the impact of operational expenditures on Sierra County by year. The total number of jobs (full and part time) generated in the county varies from 328 to 407 (excluding 2014). Peak yearly impact occurs in years 2019 and 2020, years five and six of operations. Labor income varies between \$24.3 million and \$30.3 million and total value added varies between \$105 million and \$130.5 million.

Table ES2.2

Total Impacts by Year on Sierra County From Operational Expenditures				
Year	Date	Employment	Labor Income	Value Added
-1	2014	35.6	\$2,642,731	\$11,394,774
1	2015	394.1	\$29,293,337	\$126,305,308
2	2016	397.9	\$29,577,839	\$127,532,007
3	2017	394.1	\$29,294,882	\$126,311,966
4	2018	400.7	\$29,785,151	\$128,425,882
5	2019	407.2	\$30,268,148	\$130,508,438
6	2020	407.2	\$30,268,148	\$130,508,438
7	2021	405.7	\$30,155,679	\$130,023,502
8	2022	384.0	\$28,541,284	\$123,062,648
9	2023	382.7	\$28,446,458	\$122,653,784
10	2024	385.2	\$28,636,110	\$123,471,511
11	2025	328.1	\$24,386,042	\$105,146,318

Calculations by Authors Using IMPLAN PRO Version 3

Table ES2.3 presents the total impacts of spending by year for the state. Employment varies between 36 and 45. Labor income varies between \$1.9 million and \$2.4 million. Value added varies between \$4.6 million and \$5.8 million.

Table ES2.3

Total Impacts by Year on the Rest of the State From Operational Expenditures in Sierra County				
Year	Date	Employment	Labor Income	Value Added
-1	2014	3.9	\$210,796	\$504,117
1	2015	43.2	\$2,336,559	\$5,587,870
2	2016	43.6	\$2,359,252	\$5,642,141
3	2017	43.5	\$2,351,688	\$5,624,051
4	2018	43.9	\$2,375,788	\$5,681,687
5	2019	44.6	\$2,414,314	\$5,773,821
6	2020	44.6	\$2,414,314	\$5,773,821
7	2021	44.5	\$2,405,343	\$5,752,367
8	2022	42.1	\$2,276,572	\$5,444,412
9	2023	41.9	\$2,269,008	\$5,426,323
10	2024	42.2	\$2,284,136	\$5,462,501
11	2025	36.0	\$1,945,133	\$4,651,776

Calculations by Authors Using IMPLAN PRO Version 3

ES3 Tax Revenues Generated

Table ES3.1 presents the severance tax, processors tax and property tax revenues that will be generated over the life of the mine. The severance tax and processors tax are state revenues and the property tax is revenue accruing to Sierra County. A total of \$1.7 million in severance taxes, \$14.6 million in processor’s tax and \$6.6 million in property taxes will be generated.

Table ES3.1

Severance Taxes, Processor's Tax, and Property Tax by Year					
Year	Date	Value of			
		Minerals	Severance Tax	Processor's Tax	Property Tax*
1	2015	\$237,014,270	\$194,306	\$1,684,760	\$2,107,248
2	2016	\$247,012,996	\$201,724	\$1,748,366	\$544,801
3	2017	\$182,378,983	\$150,840	\$1,307,041	\$567,784
4	2018	\$204,567,876	\$168,526	\$1,464,771	\$419,216
5	2019	\$224,824,104	\$184,037	\$1,590,635	\$470,220
6	2020	\$179,460,370	\$147,859	\$1,276,194	\$516,780
7	2021	\$141,801,550	\$116,626	\$1,024,757	\$412,507
8	2022	\$153,196,498	\$125,576	\$1,094,717	\$325,945
9	2023	\$177,509,901	\$146,689	\$1,261,566	\$352,137
10	2024	\$192,095,471	\$157,585	\$1,347,705	\$408,024
11	2025	\$119,644,622	\$98,046	\$836,457	\$441,550
Total		\$2,059,506,642	\$1,691,812	\$14,636,969	\$6,566,213

*Property Taxes are based on the previous year mineral values except in year one when the tax is based on the value of improvements, equipment, materials, supplies and other personal property of non-operating mine.

Calculations by author

Table ES3.2 presents the gross receipts taxes, personal income taxes, corporate income taxes and the compensating taxes that are generated for construction and capital expenditures and operating expenditures by year. The gross receipts taxes are further distributed between Sierra County, other counties in the state and state revenues.

Over the life of the mine, counties in the rest of the state will receive \$1.6 million in GRT revenues and Sierra County will receive \$6.2 million in GRT revenues. The state will receive \$11.8 million in GRT revenues and \$10.4 million in compensating tax revenues. The state will also receive \$9 million in personal income tax revenues and \$2 million in corporate tax revenues.

Table ES3.2

**Gross Receipts Tax, Personal Income Tax, Corporate Income Tax and Compensating Tax by Year
Due to Construction and Capital Expenditures and Operating Expenditures**

Year	Date	County Revenues		State Revenues			
		GRT To Counties in Rest of State	GRT To Sierra County	GRT to State	Compensating Tax	Personal Income Tax	Corporate Income Tax
-1	2014	\$973,759	\$145,006	\$1,678,146	\$8,345,699	\$1,292,862	\$293,673
1	2015	\$114,403	\$560,233	\$1,011,954	\$78,663	\$779,620	\$177,090
2	2016	\$54,459	\$565,650	\$930,164	\$638,964	\$716,608	\$162,777
3	2017	\$44,974	\$560,235	\$907,813	\$0	\$699,389	\$158,866
4	2018	\$45,435	\$569,611	\$922,569	\$518,910	\$710,757	\$161,448
5	2019	\$58,085	\$578,853	\$955,406	\$0	\$736,055	\$167,194
6	2020	\$59,012	\$578,853	\$956,798	\$0	\$737,128	\$167,438
7	2021	\$64,198	\$576,704	\$961,354	\$340,893	\$740,637	\$168,235
8	2022	\$59,180	\$545,830	\$907,515	\$0	\$699,159	\$158,814
9	2023	\$50,251	\$544,013	\$891,395	\$0	\$686,740	\$155,993
10	2024	\$43,682	\$547,637	\$886,978	\$469,490	\$683,337	\$155,220
11	2025	\$37,199	\$466,359	\$755,336	\$0	\$581,919	\$132,182
Total		\$1,604,636	\$6,238,983	\$11,765,429	\$10,392,620	\$9,064,212	\$2,058,930

Calculation by Authors

The Socioeconomic Impacts of THEMAC Resources Group Ltd. Copper Flat Mine Project in Sierra County, New Mexico

1.0 Introduction

The New Mexico Copper Corporation (NMCC), wholly owned by THEMAC Resources Group Limited (THEMAC), proposes to reopen a copper mine and processing facility near Hillsboro, NM. The proposed Project would consist of an open pit mine, flotation mill, tailings impoundment, waste rock disposal areas, a low-grade ore stockpile, and ancillary facilities. In most respects, the facilities, disturbance and operations would be similar to the former facility that operated at the mine for a short period of time in the early 1980s.

The project is located in Sierra County, NM, approximately 34 miles southwest of Truth or Consequences, NM, and five miles northeast of Hillsboro, NM. Planned annual production is estimated to be 36 million pounds of copper. In addition, molybdenum, gold and silver will be produced.

The projected life of the mine is eleven years. While some mining may take place in 2014, full operation will start in 2015 and end in 2025. In 2025, some production will occur, rehabilitation of the site will take place and the mine is scheduled to close. Average operating expenses over the eleven years are just over \$76 million.

As a part of the permitting process, NMCC has commissioned Arrowhead Center, Inc. of New Mexico State University to conduct a socioeconomic impact study of the proposed mine. The estimated economic impacts are reported separately for construction and operations. The estimates include employment, labor income, value added, and output. All dollar estimates are presented in terms of 2012 dollars.

Section 2 of this report provides basic information on copper production trends in the World, the United States, and New Mexico. Four other main sections are included in the report. Section 3 is a demographic and economic profile of Sierra County, New Mexico. This profile is provided because economic impacts associated with the project become more meaningful in the context of local conditions and trends. Sections 4 and 5 contain the impact estimates. Section 4 presents the estimated economic impacts. Section 5 contains an analysis of tax revenue implications of the project including estimates of distributions of Gross Receipts Tax revenue to Sierra County. The last section, Section 6, presents some conclusions. Several appendices are included to provide additional information.

2.0 The Copper Industry

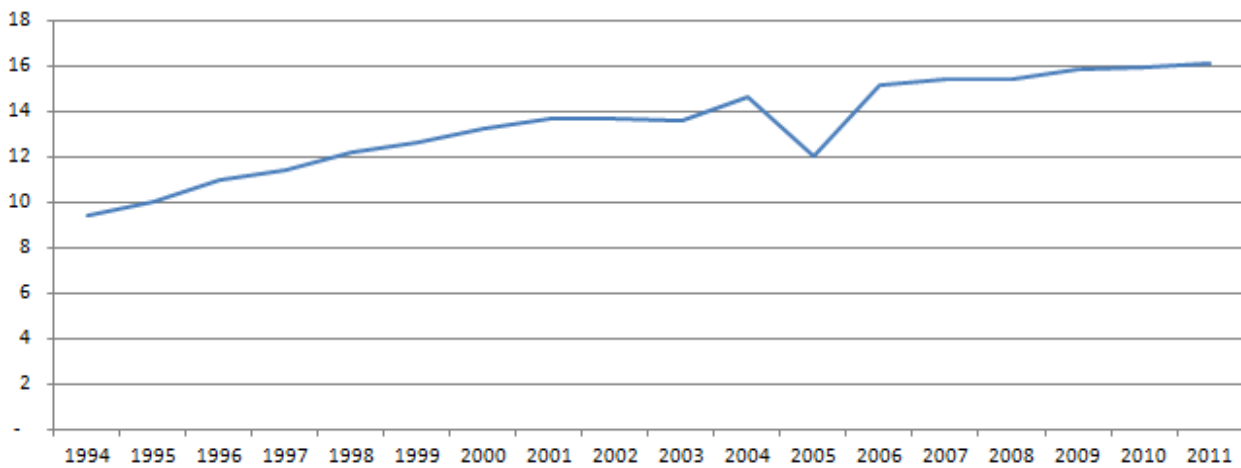
This section of the report provides information on trends in the copper industry for the world, United States and New Mexico.

2.1 World Trends

World copper production (displayed in Figure 2.1.1 since 1994) has increased steadily over the years from 9.4 metric tons in 1994 to an estimated 16.2 million metric tons in 2011. There was a slight decrease in production in 2005 when Chile, the major world producer of copper, cut its production by almost 60 percent.

Figure 2.1.1

World Copper Production (Thousands of Metric Tons)



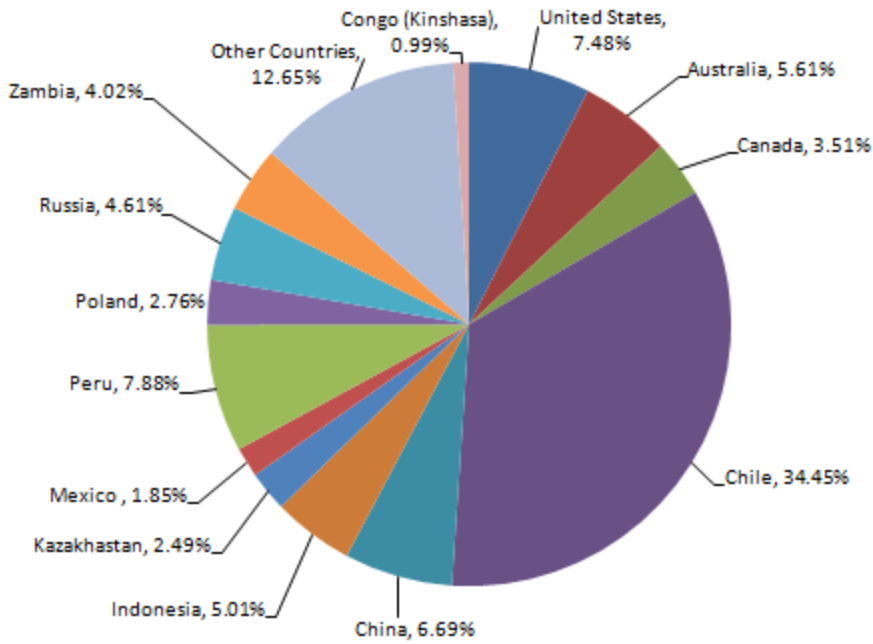
Source: U.S.G.S Minerals Yearbook, 2011

Major producers of copper include China, Chile, Peru and the United States (Table 2.1.1 and Figure 2.1.2). In 2009 and 2010, the United States was the third largest producer of copper.

Figure 2.1.2

Major Copper Producers

Percent of Production 2007-2011



Source: U.S.G.S Minerals Yearbook, 2011 and Author Computations

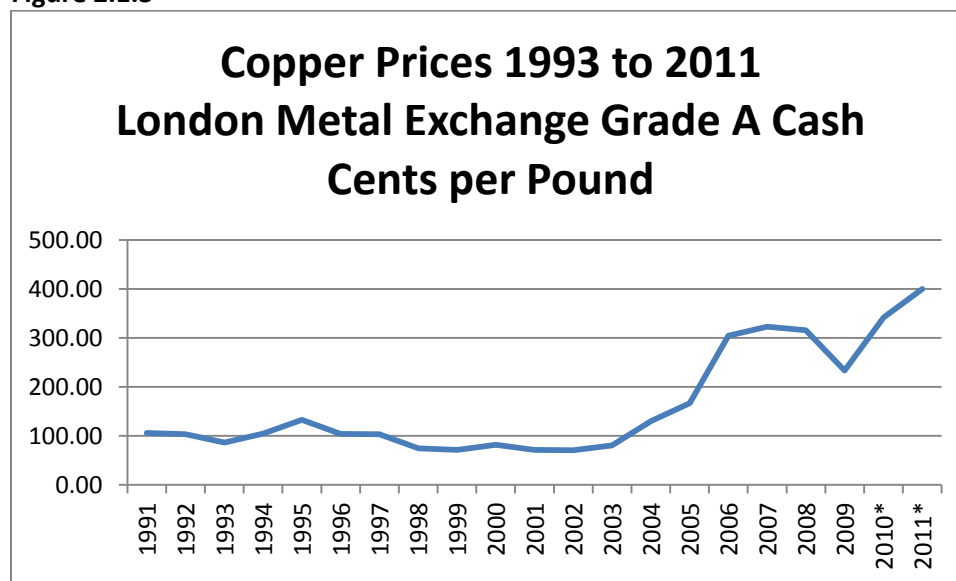
Table 2.1.1

World Copper Production 2007-2011 (Thousands of Short Tons)					
Country	2007	2008	2009	2010	2011
United States	1,170	1,310	1,180	1,110	1,120
Australia	870	886	854	870	940
Canada	589	607	491	525	550
Chile	5,560	5,330	5,390	5,420	5,420
China	946	950	995	1,190	1,190
Indonesia	797	651	996	872	625
Kazakhstan	407	420	390	380	360
Mexico	347	247	238	260	365
Peru	1,190	1,270	1,275	1,250	1,220
Poland	452	430	439	425	425
Russia	740	750	725	703	710
Zambia	520	546	697	690	715
Congo (Kinshasa)				343	440
Other Countries	1,840	2,030	2,190	1,900	2,000
World Total	15,428	15,427	15,860	15,938	16,080

Source: Mineral Commodity Summaries, 2012

Nominal copper prices were relatively stable during the early 2000s and increased rapidly between 2005 and 2009 (Figure 2.1.3 and Table 2.1.2). In 2009 copper prices decreased by more than 25% but remained higher than the average for the decade. In 2010 and 2011 prices increased to over \$4.00 per pound.

Figure 2.1.3



Source: USGS Copper Statistics and Information (Minerals Yearbook 1932-2010)
<http://minerals.usgs.gov/minerals/pubs/commodity/copper/>

Table 2.1.2

Copper Prices by Year (Cents per Pound)			
Year	Producer, weighted average	COMEX, first position*	LME, Grade A cash*
1991	109.33	104.88	106.21
1992	107.42	102.72	103.72
1993	91.56	85.28	86.76
1994	111.05	107.05	104.64
1995	138.33	134.72	133.12
1996	109.04	105.87	104.05
1997	106.95	103.58	103.25
1998	78.64	75.08	75.01
1999	75.91	72.11	71.33
2000	88.16	83.97	82.24
2001	76.85	72.57	71.57
2002	75.80	71.67	70.72
2003	85.25	81.05	80.68
2004	133.94	128.97	129.96
2005	173.49	168.23	166.84
2006	314.75	308.94	304.85
2007	328.00	322.17	322.83
2008	319.16	313.35	315.47
2009	241.24	235.42	233.56
2010**	348.30		341.70
2011**	405.00		405.26

*COMEX – New York Commodities Exchange;

**Source: Mineral Commodity Summaries, 20

Source: USGS Copper Statistics and Information
(Minerals Yearbook 1994-2011)

<http://minerals.usgs.gov/minerals/pubs/commodity/cc>

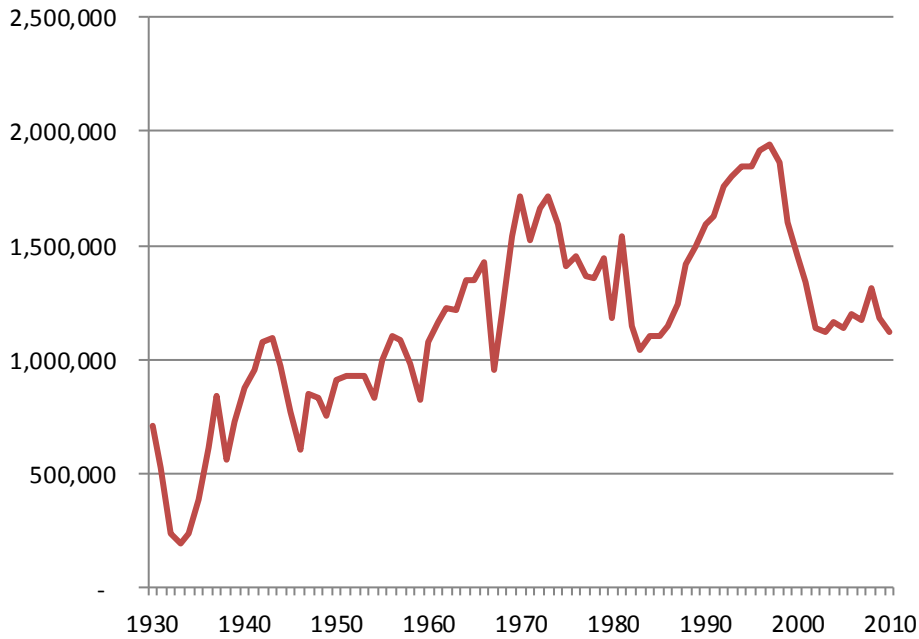
2.2 United States Trends

U.S. copper production reached a level of over 1.7 million metric tons in 1973 and then slowly declined to a production level of just over 1.0 million metric tons in 1983 (Figure 2.2.1). Through the late 1980s and 1990s production increased steadily, and then decreased during the early 2000s. During the last decade (2001 to 2010) U.S. copper production averaged 1.22 million tons per year. Domestic production fell to 1.18 million metric tons in 2009 and to 1.12 million metric tons in 2010 due to the

recession. Five states accounted for 99% of copper production in the U.S. Those states were (in order of production): Arizona, Utah, New Mexico, Nevada, and Montana. Copper was also recovered in Idaho and Missouri.

Figure 2.2.1

U.S. Copper Production: 1930 to 2010 (Thousands of Metric Tons)



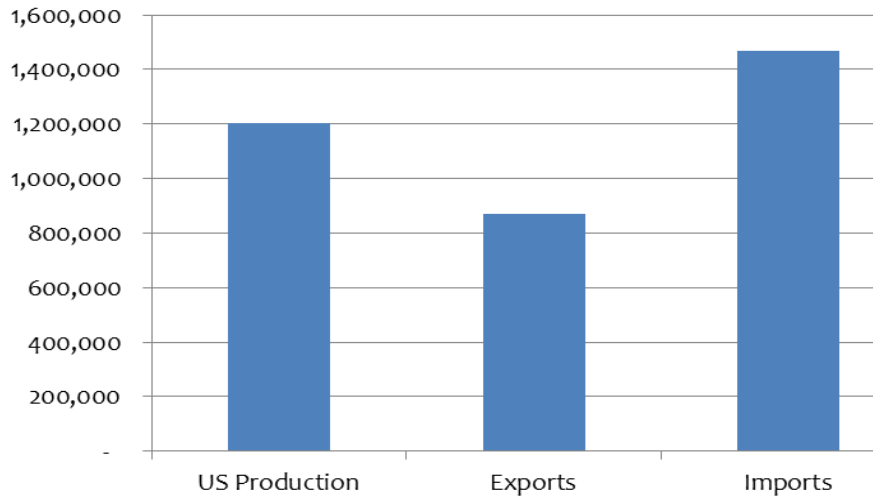
Source: USGS Copper Statistics and Information (Minerals Yearbook 1932-2010)

The United States is both an importer and exporter of copper. From 2001 to 2011 U.S. imports of copper averaged 4.6 million metric tons per year or 4.3 times as large as domestic production. During the same time period, the U.S. exported 294 thousand metric tons per year or 27.5 percent of domestic production (Figure 2.2.2 and Table 2.2.1).

Figure 2.2.2

U.S. Production, Imports, and Exports

Annual Average 2000 to 2011 (Metric Tons)



Source: USGS Copper Statistics and Information (Minerals Yearbook 1932-2012)

Table 2.2.1

U.S. Copper Production, Imports, and Exports: 2000 to 2011

(Thousands of Metric Tons)

Year	Production	Exports	Imports
2000	1,450	744	2,410
2001	1,340	579	2,391
2002	1,140	533	2,157
2003	1,120	796	2,022
2004	1,160	907	1,867
2005	1,140	855	2,230
2006	1,200	1,096	1,070
2007	1,170	835	832
2008	1,310	1,127	721
2009	1,180	1,013	645
2010	1,110	1,110	620
2011	1,120	n/a	650

Source: USGS Copper Statistics and Information (Minerals Yearbook 1932-2012)

2.3 New Mexico Trends

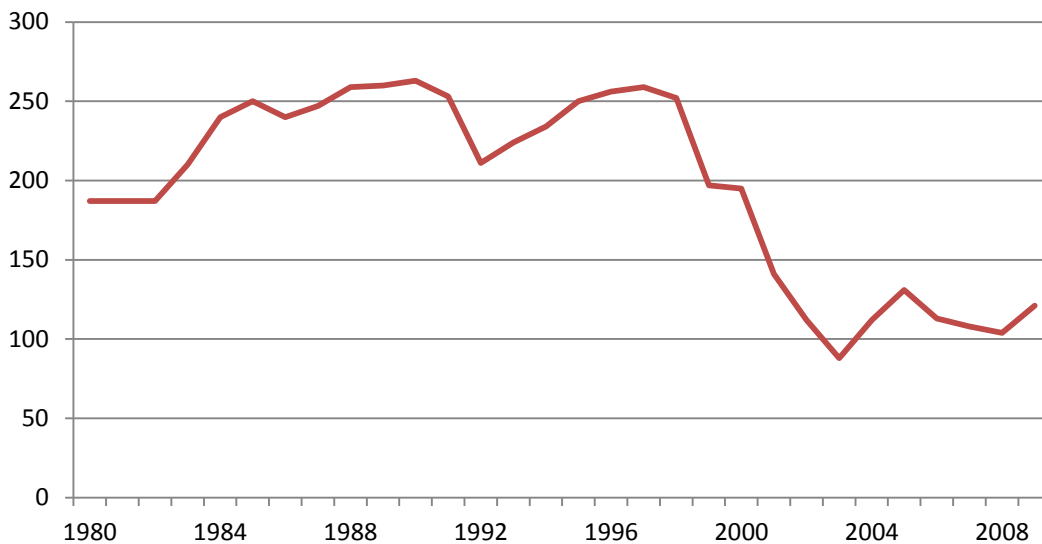
In 2012 three copper mines, two extraction/electro-winning plants and one concentrator were operating in New Mexico. All operations are owned by Freeport McMoran. New Mexico ranks third among all the states in the production of copper.

New Mexico copper production has decreased over the last 20 years from its 1990 peak of 263 thousand metric tons (Figure 2.3.1). Production levels reached a low (for this time period) of 88,000 metric tons in 2003. Slight increases in production occurred in 2004 and 2005 but production then fell through 2008. A small increase in production occurred in 2009.

Figure 2.3.1

New Mexico Copper Production: 1980 to 2009

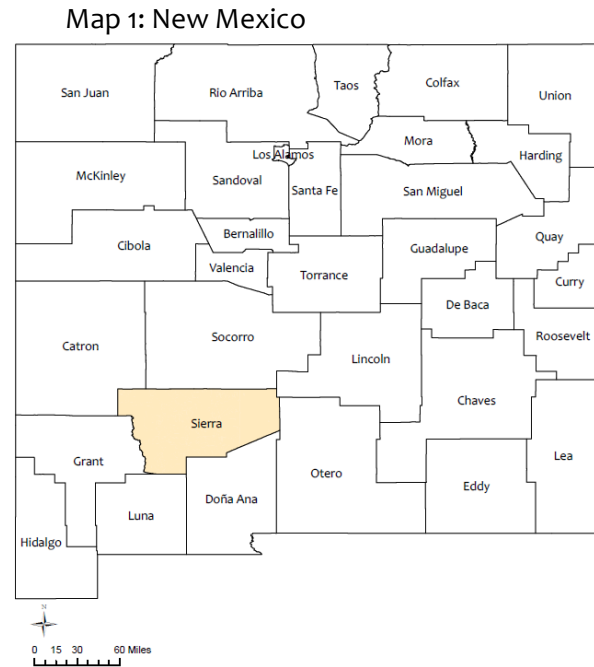
(Thousands of Metric Tons)



Source: USGS New Mexico Minerals Information (Minerals Yearbook 1980-2010)

Section 3: Sierra County Economic and Demographic Profile

New Mexico Copper Company’s Copper Flat Project is located in Sierra County, New Mexico in the southwestern portion of the state (Map 1). The economic impacts of the proposed mine will take place within the context of economic and demographic conditions in Sierra County. This profile of Sierra County describes key economic and demographic variables and provides comparisons of the county to the state and nation. Section 3.1.11 provides a summary of this section.



Source: Arrowhead Center, New Mexico State University

3.1 Demography: Size and Change in Population

Sierra County’s population in 2010 was 11,988 or 0.6 percent of the state’s total population. From 2000 to 2010 Sierra County’s population decreased by 9.66 percent while the state’s population increased by 8.99 percent and the nation’s population increased by 9.7 percent. (Table 2.1)

Table 2.1 and Figure 2.1 display population data and population growth rates for Sierra County, the State of New Mexico, and the United States from 1950 to 2010. During this sixty-year period, Sierra County’s population growth rates have been highly variable –decreasing by 10.8 percent in the 1950s and then increasing by 12.17 percent during the 1960s. In the 1980s and 1990s Sierra County’s population increased faster than the state and the nation. The net increase in Sierra County’s population during the past half century was 87 percent, while the nation’s population increased by 72 percent and the state’s population increased by 108 percent.

Table 3.1.1

Population and Percent Change In Populaton in the United States, New Mexico, and Sierra County: 1950-2010						
Year	Population			Percent Change		
	Sierra County	New Mexico	United States	Sierra County	New Mexico	United States
1950	7,186	681,187	151,325,798			
1960	6,409	951,023	179,323,175	-10.81	39.61	18.50
1970	7,189	1,016,000	203,211,926	12.17	6.83	13.32
1980	8,454	1,302,894	226,545,805	17.60	28.24	11.48
1990	9,912	1,515,069	248,709,873	17.25	16.28	9.78
2000	13,270	1,819,046	281,421,906	33.88	20.06	13.15
2010	11,988	1,982,610	308,745,538	-9.66	8.99	9.71

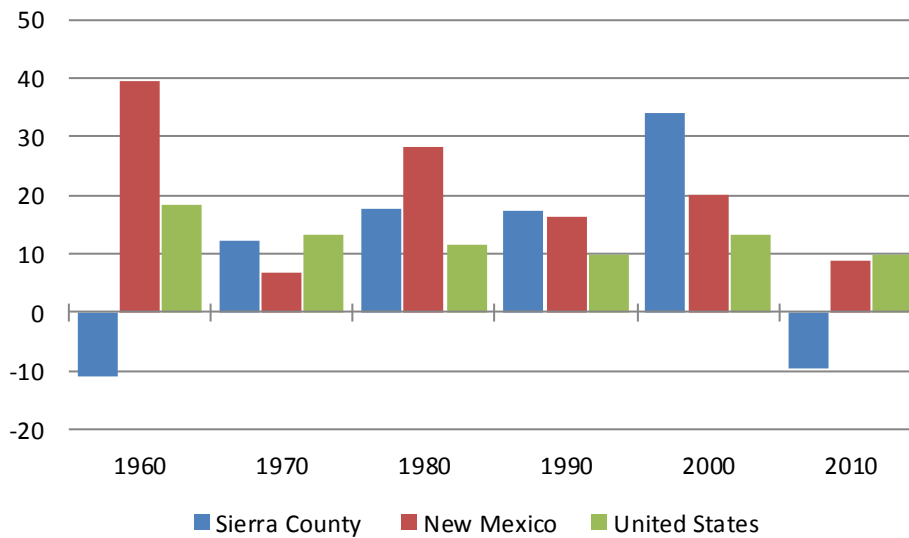
Source: U.S. Census Bueau, 2010 Census

P1:Race -Universe: Total Population

2010 Census Summary File 1

Figure 3.1.1

Percent Change in Population by Decade: Dierra County, New Mexico, United States



Source: U.S. Census Bureau, 2010 Census, 2010 Census Summary File 1

3.2 Components of Population Change 2010-2011

For a given geographic area, population change occurs as a result of three demographic variables: births, deaths, and migration. Trends in these components of change are important indicators of future population growth. In turn, the size and age-sex composition of the population are important determinants of an area's labor force.

The Census Bureau produces annual population estimates in non-census years¹. Frequently, the estimates differ considerably from the population figures of the decennial census. This should not be surprising. The decennial census is based on actual counts of the population while the estimates are produced using a variety of methods. Generally speaking, the birth and death estimates are the most reliable parts of the population estimates program. Births and deaths can be estimated from vital statistics data and all states require the recording of births and deaths. The migration estimates should be regarded with more caution. There are no public records of when and where people decide to move.

Table 3.2 below summarizes the components of population change reported by the Census Bureau between the years 2010 and 2011. During this year, Sierra County was reported to have lost 74 persons. Sierra County lost 146 persons because deaths exceeded births and gained 72 persons due to immigration. Given the age and sex distribution of the population (see below), decreases in population due to negative 'natural increase' can be expected to continue. The statistics on births and deaths are the most reliable while the migration statistics are less so.

Table 3.2.1

**Components of Population Change
Sierra County, New Mexico 2010-2011**

Population Change	-74
Natural Increase	-146
Births	99
Deaths	245
Net Migration	72
Net International	-4
Net Internal	76

Source: U.S Bureau of the Census, Population Division,
Table 5. Estimates of the Components of Resident Population Change for Counties of New Mexico: July 1, 2010 to July 1, 2011 (CO-EST2011-05-35)
U.S. Census Bureau, Population Division
Release Date: April 2012

¹ The discussion of the components of population change presented here is based on U.S. Census Bureau estimates. The Bureau's estimates program is distinct from the American Community Survey data presented elsewhere and differences may be apparent.

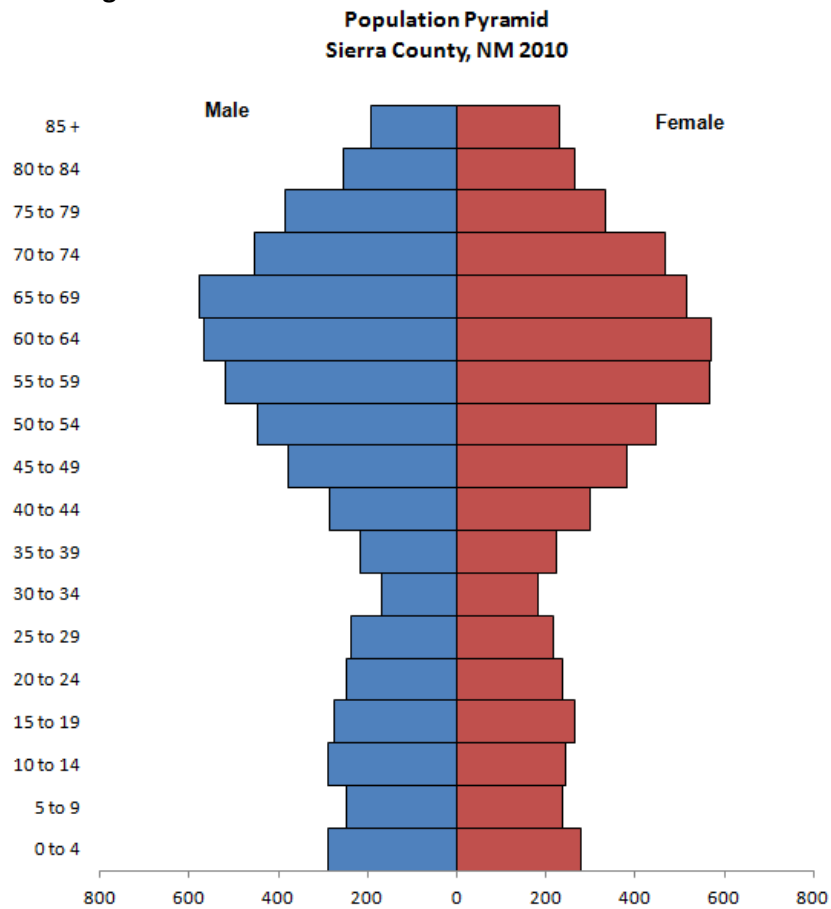
3.3 Age and Sex Distribution

Similar to state and national patterns, the population of Sierra County is aging. In 1970, the median age in Sierra County was 43.6 years. In 2010, Sierra County’s median age (54.5 years) was more than ten years higher than in 1970 and was considerably above that of the state (36.7) and nation (37.2).

Source: U.S. Bureau of the Census, 2010 Census of Population and Housing, Summary File 1, <http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?ftp=table>

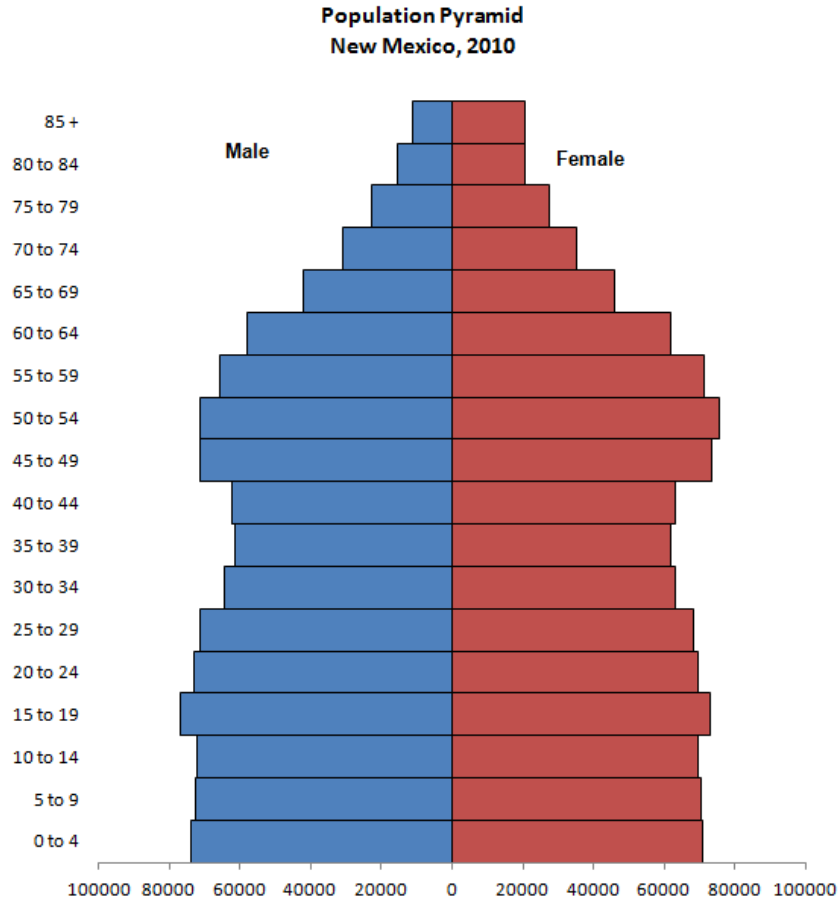
A population pyramid for Sierra County in 2010 based on five year age and sex data is displayed in Figure 3.3.1. Sierra County’s age distribution is very different than that of the state as a whole (Figure 3.3.2). Sierra County’s 2010 older population (65 years and older) accounted for 30.6 percent of the total population while the corresponding figure for the state was 13.2 percent. Those who are most likely to be in the labor force (ages 16 to 64) accounted for 55.2 percent of Sierra County’s 2010 population and 65.5 percent of the state’s population.

Figure 3.3.1



Source: U.S. Census, American Factfinder 2, 2010 Census Summary File 1

Figure 3.3.2



Source: U.S. Census, American Factfinder 2, 2010 Census Summary File 1

3.4 Population Projections

Population projections of Sierra County are available from the Bureau of Business and Economic Research at the University of New Mexico (UNM-BBER) (<http://www.unm.edu/~bber/demo/table1.htm>). The most recent set of UNM-BBER projections were released in 2008. The UNM-BBER projections are shown in Table 3.4.1. The UNM-BBER projections show modest growth in Sierra County’s population through 2035. These numbers were estimated before the 2010 census and thus show positive population increases when, in fact, the population has decreased. For the county to attain these levels of population it must rely on in-migration not natural increases (as related above).

Table 3.4.1

New Mexico and Sierra County Population Projections

Year	Sierra County	New Mexico
2005	13,657	1,969,292
2010	13,717	2,162,331
2015	13,793	2,356,236
2020	13,887	2,540,145
2025	13,959	2,707,757
2030	13,989	2,864,796
2035	14,028	3,018,289

Source: Bureau of Business and Economic Research, University of New Mexico
 Population Projections, July 1 2005 to July 1, 2035
<http://bber.unm.edu/demo/table1.htm>

3.5 Race and Ethnicity

The racial and ethnic composition of the population of Sierra County, NM along with comparisons for the US and New Mexico are displayed in Table 3.5.1. Sierra County has a higher proportion of individuals who self-selected white as race in the American Community Survey than both New Mexico and the nation as a whole. The percentage of individuals selecting black for Sierra County was .4 percent, a smaller percentage than for the state (2.1 percent) and both of these percentages are much smaller than the national percentage of 13.3. The percentage of Native Americans in Sierra County (1.7) is much smaller than the state percent of 9.4 but over twice the national percentage of 0.8. The percentage of Hispanics in Sierra County (28.0) is less than the percentage for the state (46.3) and almost twice the percentage for the nation (16.3)².

Table 3.5.1

Race and Ethnicity in the United States, New Mexico, and Sierra County

	Total	White	Black	Native American	Other*	Hispanic**
United States	309,349,689	229,397,472	38,874,625	2,553,566	19,107,368	50,477,594
(percent of total)	100.0%	74.2%	12.6%	0.8%	6.2%	16.3%
New Mexico	2,059,179	1,407,876	42,550	193,222	308,503	953,403
(percent of total)	100.0%	68.4%	2.1%	9.4%	15.0%	46.3%
Sierra County	11,988	10,265	49	199	1,032	3,352
(percent of total)	100.0%	85.6%	0.4%	1.7%	8.6%	28.0%

*Other includes persons who selected Asian, Native Hawaiian and Other Pacific Islander, or some other race.

**Persons of Hispanic Origin May be of any racial group.

Source: US Bureau of the Census, Census 2010: Summary File 1

² Ethnicity (Hispanic Origin) is a different concept than race. A person of Hispanic origin may belong to any racial group. If summed, the race and ethnicity figures will add to more than 100 percent of the population.

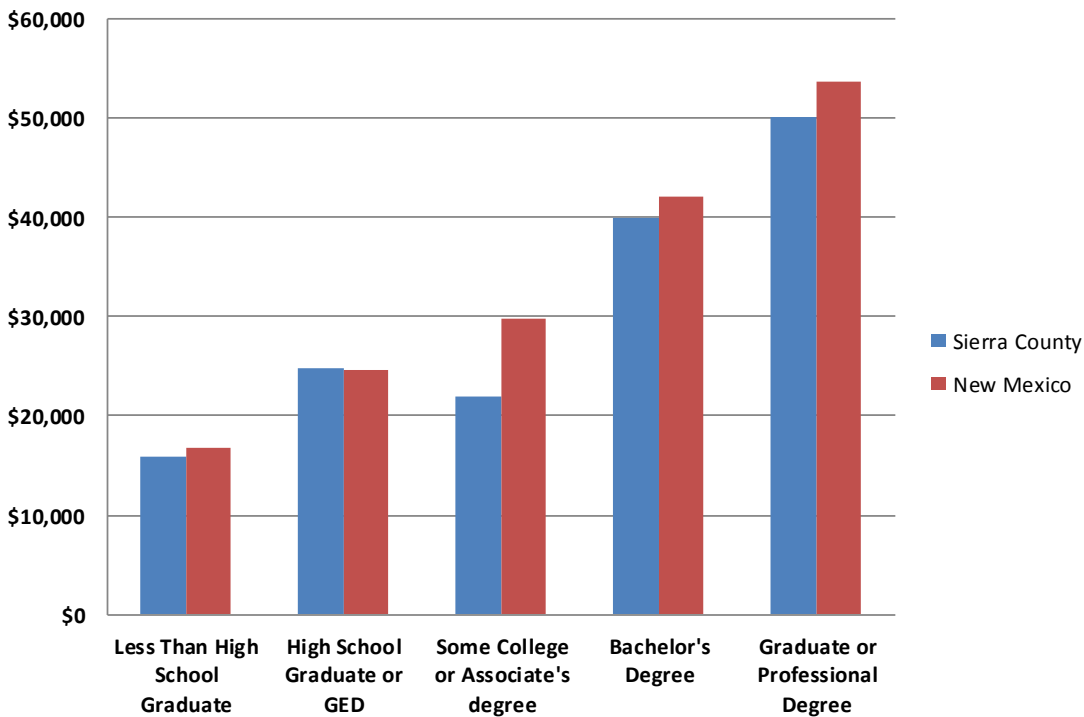
3.6 Educational characteristics:

Educational attainment is a key factor in explaining both labor force participation and income variation among individuals and geographic regions. At the county level in New Mexico, the simple correlation between the percent of the population 25 years old and older who had graduated from high school and per capita income is 0.746 (Source: author computations from 2005-2009 American Community Survey data). The relationship between education and income is stronger at higher levels of education. The simple correlation between per capita income and the percent of the population 25 years old and older who have a bachelor’s degree is 0.905 and 0.914 between per capita income and those who hold an advanced degree. The income measure used does not matter a great deal. Similar correlations are found using median household income or median family income.

Figure 3.6.1 displays annual earnings by educational attainment in Sierra County and in New Mexico. Earnings include wages and salaries as well as the profits of proprietors. Earnings do not represent total income which also includes such items as transfer payments and dividends, interest and rent. In Sierra County, a college graduate earns over one and a half times as much per year as a high school graduate. Except for those individuals with a GED or who are high school graduates, Sierra County has lower earnings than the corresponding state average.

Figure 3.6.1

Yearly Earnings by Educational Attainment of Population 25 years and Older: US, Sierra County, NM



Source: US Census Bureau, 2010 ACS

Data in Table 3.6.2 indicate that 83.9 percent of the population, 25 years old and older, in Sierra County were high school graduates or higher, while the national figure was 85 percent and the state figure was 82.7 percent. Sierra County had a higher percentage of persons with just a high school education and a smaller percentage of persons with bachelor’s degrees and graduate degrees compared to the state and nation.

Table 3.6.2

Educational Attainment of the Population 25 Years Old and Older: U.S, New Mexico and Sierra County, NM

	United States		New Mexico		Sierra County	
	Number	Percent	Number	Percent	Number	Percent
Population 25 Years Old and Older	199,726,659	100.00%	1,296,627	100.00%	8,488	100.00%
Less than 9 th Grade	12,435,227	6.20%	101,101	7.80%	637	7.50%
9 th to 12 th grade, no Diploma	17,463,256	8.70%	123,052	9.50%	732	8.60%
High School graduate	57,903,353	29.00%	349,895	27.00%	3,166	37.30%
Some College no degree	41,175,904	20.60%	299,157	23.10%	2079	24.50%
Associate Degree	15,021,920	7.50%	93,389	7.20%	444	5.20%
Bachelor’s degree	35,148,428	17.60%	189,601	14.60%	971	11.40%
Graduate or Professional degree	20,578,571	10.30%	140,432	10.80%	459	5.40%
Percent High School Graduate or Higher		85.00%		82.70%		83.90%
Percent Bachelor’s Degree or Higher		27.90%		25.50%		16.80%

Source: U.S Bureau of the Census, 2006 – 2010 ACS 5 – year estimates

3.7 Housing Characteristics

Table 3.7.1 displays selected housing characteristics in the United States, New Mexico, and Sierra County. On average for the five year period (2006-2010), only 56% of the existing housing units were occupied. Housing prices and rental rates are lower in Sierra County than in the state or nation. The median value of owner occupied housing units (\$92,800) in Sierra County was less than half of the national figure and just more than half of the state value. Median rent in Sierra County is also lower than both the national and state figures. In the county mobile homes account for a much larger percentage of housing units (40.30 percent) than in the state (16.7 percent) and in the nation (6.7 percent). The average household size in Sierra County (1.98) is smaller than in the state and nation.

Table 3.7.1

Selected Housing Characteristics in the U.S, New Mexico and Sierra County, NM

	United States		New Mexico		Sierra County	
	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	130,038,080	100.00%	887,890	100.00%	8,464	100.00%
Mobile Homes	8,684,414	6.70%	148,409	16.70%	3,409	40.30%
Housing Units Built in 2005 or later	5,273,880	4.10%	38,159	4.30%	111	1.30%
Average Household size						
Owner Occupied		2.67		2.67		2.5
Renter Occupied		2.42		2.46		2.37
Average Household Size		2.58		2.55		1.98
Median Value (Owner Occupied)	\$188,400	100.00%	\$158,400	84.08%	\$92,800	49.26%
Median Gross Rent	\$841		\$683		\$513	
Median Monthly Housing Costs						
Owner Occupied		\$1,126		\$799		\$367
Renter Occupied		\$841		\$683		\$513

Source: U.S Bureau of the Census, 2006 – 2010 ACS 5 – year estimates

3.8 Income and Poverty

While household and family incomes in Sierra County are low compared to state and national figures, on a per capita basis, Sierra County ranks ninth among all counties and is 96% of the state per capital income. As shown in Table 3.8.1 below, median household income in Sierra County was 49.28 percent of the national figure and median family income was 61.35 percent of the national figure. Poverty rates in Sierra County (15.6 percent of families) were higher than nation (10.1 percent of families) and the state (13.9).

Table 3.8.1

Selected Income and Poverty Data for Sierra County, New Mexico, and the United States

	Sierra County	New Mexico	United States
Median Household Income	25,642	42,742	51,425
Percent of U.S.	60.0	83.1	100
Median Family Income	34,571	51,205	62,363
Percent of U.S.	67.5	82.1	100
Percent of Families Below Poverty	18.5	13.7	9.9

Source: US Census Bureau, 2005-2009 ACS 5-year Estimates

[http://factfinder.census.gov/servlet/DatasetMainPageServlet?](http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=datasets_2&_lang=en)

[_program=ACS&_submenuId=datasets_2&_lang=en](http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=datasets_2&_lang=en)

3.9 Labor Force and Employment

Sierra County had a much smaller labor force participation rate (37.7 percent) than the state (61.9) and in the nation (65). Sierra County's unemployment rate (4.3 percent) was lower than the state unemployment rate (7.2 percent) and both were lower than the nation's unemployment rate (7.9 percent) (Table 3.9.1). From 2000 to 2010 the number of employed persons increased by 13.6%.

Table 3.9.1

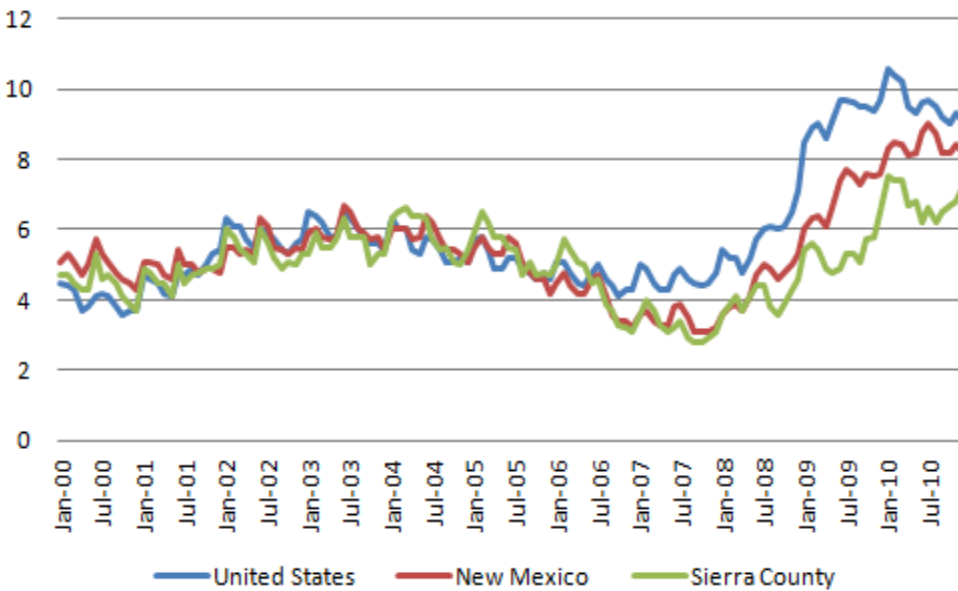
Employment Status of the Population 16 Years Old and Older

	United States		New Mexico		Sierra County, NM	
	Number	Percent	Number	Percent	Number	Percent
Population 16 years +	238,733,844	100.00%	1,561,181	100.00%	10,072	100.00%
In Labor Force	155,163,977	65.00%	966,423	61.90%	3,795	37.70%
Civilian Labor Force	154,037,474	64.50%	957,903	61.40%	3,795	37.70%
Employed	141,833,331	59.40%	888,761	56.90%	3,630	36.00%
Unemployed	12,204,143	5.10%	69,142	4.40%	165	1.60%
Percent Unemployed		7.90%		7.20%		4.30%
Armed Forces	1,126,503	0.50%	8,520	0.50%	0	0.00%
Not in Labor Force	83,569,867	35.00%	594,758	38.10%	6,277	62.30%

Source: U.S Bureau of the Census, 2006 – 2010 ACS 5 – year estimates

Monthly seasonally unadjusted unemployment data (BLS, Local Area Unemployment Statistics) for the most recently available ten year period are displayed in Figure 3.9.2 below for Sierra County and the State of New Mexico. Until 2008 the unemployment rate for Sierra County was similar to the state unemployment rate. From 2008 on, the county unemployment rate has been smaller than the state rate.

Figure 3.9.2
Unemployment in Sierra County, New Mexico, and United States



Source: Author diagram. Data Source: US Bureau of Labor Statistics
<http://www.bls.gov/data/#unemployment>

3.10 The Structure of Industry in Sierra County

The structure of industry within a region is an important determinant of the impact of new economic activity. The levels of per capita income and poverty rates in Sierra County are also a reflection of the structure of industry in the area. The distribution of public and private sector employment in Sierra is displayed in Table 3.10.1.

Nearly half (47.62 percent) of total employment in Sierra County is concentrated in four sectors (Table 2.9) 2010. Government (federal, state, and local) employment accounted for 18.8 percent of total employment; the retail trade sector accounted for 12.4 percent of total employment; the construction sector accounted for 9.0 percent of total employment; and farm employment accounted for 7.4 percent of employment.

The size of industries in a region does not tell the whole story. Economic base theory suggests that economic development depends on industries that export goods and services out of the region (basic industries), as opposed to those businesses whose services remain local (non-basic). Basic activities—often said to include mining, agriculture, tourism, and manufacturing among other sectors—promote economic growth by bringing jobs and income into the local economy. Non-basic activities do not drive the economy in the same way that basic activities do.

Non-basic activities serve local residents and provide support for basic industries. Examples of non-basic industries typically include activities such as health care, finance, and real estate.

Table 3.10.1

Sierra County Employment by Sector, 2009

Industry	Employment	% of Total Employment
Wage and salary employment	3,444	69.0%
Proprietors employment	1,547	31.0%
Farm proprietors employment	224	4.5%
Nonfarm proprietors employment	1,323	26.5%
Farm employment	368	7.4%
Nonfarm employment	4,623	92.6%
Private employment	3,683	73.8%
Forestry, fishing, related activities	n.a.	n.a.
Mining	n.a.	n.a.
Utilities	n.a.	n.a.
Construction	449	9.0%
Manufacturing	141	2.8%
Wholesale trade	n.a.	n.a.
Retail trade	620	12.4%
Transportation and warehousing	72	1.4%
Information	30	0.6%
Finance and insurance	119	2.4%
Real estate and rental and leasing	194	3.9%
Professional and technical services	214	4.3%
Management of companies	-	0.0%
Administrative and waste services	107	2.1%
Health care and social assistance	n.a.	n.a.
Arts, entertainment, and recreation	n.a.	n.a.
Other services, except public administration	295	5.9%
Government and government enterprises	940	18.8%
Federal, civilian	122	2.4%
Military	34	0.7%
State and local	784	15.7%
State government	296	5.9%
Local government	488	9.8%
Total employment	4,991	100.0%

Source: Bureau of Economic Analysis, Regional Economic Information System, www.bea.gov

Arrowhead Center produces economic base studies for each of New Mexico's counties, Metropolitan Statistical Areas, and the state as a whole on an annual basis. The economic base studies contain a detailed explanation of how basic and non-basic industries were selected as well as additional information not included here. The economic base studies were most recently updated in January, 2011. These studies are available at:

<http://arrowhead.nmsu.edu/arrowheadcenter/policyanalysis/economic-base-studies.html> .

Data were not available in the accommodation and food services and the arts, entertainment and recreation sectors after 2006. However in 2005 and 2006, these sectors were considered basic industries because they reflect the large tourism bases of Elephant Butte Lake State Park and the mineral hot springs of Truth or Consequences. Hence, for this analysis the accommodation and food services industries and the arts, entertainment and recreation industries within Sierra County could be considered basic activities (tourism is usually considered a basic industry).

Even though the construction industry represents a high level of employment, it is usually considered a supporting industry and is not considered a basic industry.

The entry labeled government and government enterprises is not a separate industry, but merely the sum of the other government categories. However local government is probably best considered a non-basic economic sector. Hence, no government sectors are classified here as basic activities in Sierra County.

In brief, the data and analysis suggest that the following industries should be considered basic industries in Sierra County:

1. Agriculture and related industries, including 224 farm proprietors and 368 farm employees for a total of 592 jobs.
2. Accommodation and food services, which accounted for 481 total jobs in 2006.
3. Arts, entertainment, and recreation, which accounted for 117 total jobs in 2006.

In order to provide some information on some of the sector data that were not available in the BEA data, the RP-80 reports for the receipt of gross receipts taxes by the State of New Mexico were analyzed. The data consists of the number of businesses that paid gross receipts taxes during a particular quarter. Table 3.10.2 indicates the number of businesses, on average, who reported gross receipts during 2010 and the first quarter of 2011. Some businesses must report gross receipts on a monthly basis, some bi-annually and some yearly. The data provided by the state is the number of reports for the quarter. The authors divided each of these numbers by three to get an average of individual businesses. Since some businesses only report in the last month of the quarter, the method here will slightly underestimate the number of actual number of businesses reporting.

Table 3.10.2 provides information on six categories of businesses that were available in the employment information from BEA: Agriculture, Forestry, Fishing and Hunting; Utilities; Wholesale Trade; Health Care and Social Assistance; Arts, Entertainment and Recreation; and Accommodation and Food Services. The data in Table 3.10.2 are business counts not employment. Many of these businesses may be sole proprietorships and may not employ many individuals.

Table 3.10.2

Sierra County Quarterly Business Counts

	2010 - Qtr 2	2010 - Qtr 4	2011 - Qtr 2
Agriculture, Forestry, Fishing and Hunting	4	8	5
Mining and Oil and Gas Extraction	*	*	*
Utilities	13	21	12
Construction	123	153	152
Manufacturing	27	31	30
Wholesale Trade	70	60	63
Retail Trade	269	259	248
Transportation and Warehousing	15	12	11
Information and Cultural Industries	134	119	121
Finance and Insurance	8	9	12
Real Estate and Rental and Leasing	41	47	52
Professional, Scientific and Technical Services	81	90	80
Management of Companies and Enterprises	*	*	*
Admin and Support, Waste Mgt	15	14	13
Educational Services	*	*	*
Health Care and Social Assistance	25	26	30
Arts, Entertainment and Recreation	8	12	6
Accommodation and Food Services	56	57	53
Other Services (except Public Admin)	205	210	205
Public Administration	*	*	*
Unclassified Establishments	6	3	*

Source: New Mexico Taxation and Revenue Department

<http://www.tax.newmexico.gov/Pages/TRD-Homepage.aspx>

Quarterly RP-80 Reports: Gross Receipts by Geographic Area and 2-digit NAICS Code

3.11 Summary

Even though Sierra County's population has decreased over the last ten years, the number of individuals employed has increased. The unemployment rate was below the state average. Only 37.7% of the population was in the labor force, a much lower participation rate than the state (61.9%). The percentage of the population age 16-64 was also lower than the state, 55.2% for Sierra County and 65.5% for the state. The median age in Sierra County, therefore, was higher than that of the state or nation. A larger proportion of the Sierra County's population had only a high school degree or GED than the state.

While household and family incomes in Sierra County are low compared to state and national figures, on a per capita basis, Sierra County ranked ninth among all counties and had a per capita income level that was 96% of the state level. Household size was smaller in Sierra County than in the state and nation.

On average for the five year period (2006-2010), only 56% of the existing housing units were occupied. Housing prices and rental rates were lower in Sierra County than in the state or nation. In the county mobile homes accounted for a much larger percentage of housing units (40.30 percent) than in the state (16.7 percent) and in the nation (6.7 percent).

3.12 About the Data

The most comprehensive and reliable counts of population and housing units are those from the decennial censuses of population and housing conducted in years ending in zero by the U.S. Bureau of the Census.

Annual population estimates used here are from the Census Bureau's estimates program and the U.S. Department of Commerce, Bureau of Economic Analysis (BEA) Regional Economic Information System. Ultimately, the BEA population estimates are derived from the Census estimates but occasionally differ slightly from the most recently released Census estimates. The BEA population estimates are used because (a) they are the same population figures used in the computation of per capita income, also provided by BEA, and (b) the BEA population figures from 1969 on are more easily accessible than the Census Bureau estimates.

In recent years, the American Community Survey (ACS) conducted by the Bureau of the Census provides detailed demographic, income, and housing data for selected geographic areas (U.S. Bureau of the Census 2010b). The ACS replaced the long form of the decennial census in 2010 – the source of detailed social and economic characteristics of the population. The ACS reports data for all states and nearly all counties and communities using a five year rolling average. The ACS data sets recently released cover the years 2005-2009.

All race and ethnicity data collected by the Census Bureau now reflect self-identification. Multiple race categories are permitted by the Census Bureau. The Census Bureau recognizes five racial categories (white, black, Native American, Asian and Pacific Islander, and Other). However, a total of 57 different racial categories can be found in Census data when multiple racial categories have been reported. Persons of two or more races reported below have been included in the "other racial" category. Persons of Hispanic origin may be of any racial group.

There are two main sources of labor force data for sub-state areas. The U.S. Bureau of the Census provides labor force data in the American Community Survey. The Bureau of Labor Statistics of the US Department of Labor provides sub-state area labor force data as part of its Local Area Unemployment Statistics (LAUS) program working in cooperation with each state level department of labor Bureau of Labor Statistics 2010). In New Mexico, the Department of Labor is now known as Workforce Solutions.

The two sources of labor force data (Census and BLS) are frequently inconsistent at the sub-state level. The sample sizes, estimation methods, timing, and purposes are vastly different. The two sources should be regarded as providing useful but different labor market information. In this report, data on the labor force and labor force participation are from the Census Bureau while longer data series on employment and unemployment are from BLS.

Income data are also available from two sources. For annual data, the estimates of per capita personal income from the Bureau of Economic Analysis are used and respected. The denominator in the BEA per capita income figure is a population estimate provided by the Census Bureau. In a very meaningful sense, the annual estimates of per capita income can be no better than the annual population estimates.

The inter-censal population estimates are benchmarked against census data once a decade. This means that earlier population estimates are revised –sometimes substantially revised.

Alternatives to the BEA annual income estimates are available prior to 2010 in census years (years ending in zero) and are now available through the American Community Survey on an annual basis. The Census and ACS data provide a broad range of income measures including household income, family income, per capita income, and information on the distribution of income.

The BEA and Census income data are not comparable in any meaningful fashion. Both sources of income data provide useful information but they are simply not the same. Per capita income for the US for the year 2000 reported by BEA was \$29,843 while per capita income reported for the US in the 2000 census was \$21,587 –a difference of nearly \$8,000 per person. The BEA and Census income data are based on vastly different concepts of income and data collection methods.

4.0 Economic Impacts of the NMCC Copper Flat Mine

The estimated economic impacts of New Mexico Copper Corporation's proposed Copper Flat Mine are reported in this section. The impacts occur in two distinct phases. The impacts associated with construction of the facilities are static impacts. That is, construction of the facilities is a one-time event. Construction of the project is planned to occur in 2014. Production from the mine is a long-term process anticipated to last 11 years with an average yearly production of approximately of 49 million pounds of copper, 981,000 pounds of molybdenum, 12,000 ounces of gold, and 442,000 ounces of silver. Construction and operation impacts are reported separately. Summary tables incorporating both construction and operations are also provided. The economic impacts to Sierra County and to the State of New Mexico are presented.

Estimated impacts are presented for employment, labor income, value added, and output. These terms are defined as follows:

- Employment refers to full and part-time jobs.
- Labor income consists of employee compensation (including benefits), supplements to wages and salaries (such as employer contributions to pension funds), and proprietor's income.
- Value added refers to the change in value of a good or service during each stage of production. Gross Domestic Product is a value added concept.
- Output refers to gross industry sales or expenditures depending on the consequences.

Additional information on these concepts can be found in the Methods Appendix of this report. Dollar impacts are presented in 2012 (constant) dollars and are not adjusted for inflation over the life of the project.

The impact estimates include the direct, indirect, and induced effects of constructing and operating the mine. These terms are defined briefly here with additional discussion and explanation appearing in the Methods Section of this report.

- Direct effects are the immediate (or first-round) consequences of a change in economic activity or policy. For example, if a firm spends \$1 million on construction of a new building, the direct effect on output (sales) in the construction sector is \$1 million. If 8 workers are employed on the construction of the building, then those 8 workers are also a direct effect.
- Indirect effects occur because industries purchase inputs from other industries. If a construction project requires steel beams, there will be indirect effects on iron mining and coke producing industries.
- Induced effects result from households spending the wage and salary income received by those employed directly or indirectly on the new activity.
- Total effects refer to the sum of direct, indirect, and induced effects.

All cost data have been provided to the authors by the Prefeasibility Study Manager of the New Mexico Copper Corporation. All data are in 2012 dollars. In consultation with the Study Manager, expenditures for the construction phase have been allocated by spending destination. Spending has been allocated

into three categories: in-county, in-state (not in-county) and out-of-state. In-county expenditures are the basis of the county impacts and in-state expenditures are the basis for state impacts.

The impacts have been calculated using an economic modeling system (IMPLAN PRO Version 3) developed by the Minnesota Implan Group, Inc. This economic modeling software is based on input-output analysis, described in some detail in the Methods of Economic Impact Analysis, Appendix A of this report. The key feature of an input-output model is its ability to examine relationships among industries. The model is widely used in both the public and private sectors for economic impact analysis.

The IMPLAN model used in this report allowed the authors to do two things. First, it allowed a mining sector to be introduced into a county model that did not initially have a mining sector included. No mining has taken place in Sierra County since the early 1980's. The introduced mining sector is based on the national model for mining but adjusted for the characteristics of New Mexico and Sierra County. Second, the model allowed a multiregional model to be created that represented the rest of the State of New Mexico excluding Sierra County. Expenditures in Sierra County have some effect on the rest of the state and expenditures in the rest of the state have some effect on Sierra County. The multiregional analysis allows the interactions to be estimated.

4.1 Construction Impacts

Construction activities are planned for 2014. While actual construction will take thirteen months, all construction activity is assumed to take place in 2014. The expenditures include spending on construction of all administration and processing buildings and mine equipment. Total expenditures for construction and mine equipment are estimated to be just under \$298 million.

Other capital expenditures will occur during the life of the mine. These expenditures are for new mine and plant equipment to replace the mine and plant equipment initially purchased. The plant equipment will be purchased from out-of-state and will have no impact on the Sierra County or the state. The mine equipment will be purchased in-state (out-of-county) and will have an impact on the state and then indirectly on Sierra County.

The estimated impacts for the Sierra County due to construction and capital expenditures for 2014 are presented in Table 4.1.1.

Table 4.1.1

Impact of Capital Expenditures - Sierra County - 2014

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	145.8	\$3,925,708	\$5,525,737	\$16,037,000
Indirect Effect	15.2	\$492,369	\$749,799	\$1,448,989
Induced Effect	20.1	\$509,277	\$1,073,693	\$1,832,825
Total Effect	181.1	\$4,927,354	\$7,349,230	\$19,318,815

Calculations by Authors Using IMPLAN PRO Version 3

Approximately 146 direct jobs (full time and part time) will be generated by the construction work itself. Almost fifteen jobs (indirect) will be generated through purchases from local businesses. And another twenty jobs (induced) we be generated through the purchases of those receiving income and

consequently spending that income locally. A total of 181 jobs will be generated in the county during the construction period.

During the construction period almost \$5 million of labor income will be generated. Of this amount, \$3.9 million is direct labor income, \$.5 million is indirect, and \$.5 million is induced. Value added, a gross state product measure, totals \$7.3 million and total output totals over \$19.3 million.

The top ten sectors affected by the capital and construction expenditures in Sierra County, and the number of jobs generated in each sector, are listed in Table 4.1.2. As expected, construction and transportation are the top sectors affected. Food services and drinking places is the third most affected sector.

Table 4.1.2

Top Ten Sectors Affected by Construction Expenditures in Sierra County	
Sector	Employment
Construction of new nonresidential commercial and health care structures	135.9
Transport by truck	10.1
Food services and drinking places	4.7
Architectural, engineering, and related services	3.3
Civic, social, professional, and similar organizations	1.9
Private hospitals	1.5
Offices of physicians, dentists, and other health practitioners	1.5
Nursing and residential care facilities	1.5
Retail Stores - General merchandise	1.2
Retail Stores - Food and beverage	1.2

Calculations by Authors Using IMPLAN PRO Version 3

The construction and capital expenditures occurring in Sierra County have an impact on the rest of the state. Those impacts for 2014 are shown in Table 4.1.3. Direct Effects are zero since the impacts on the rest of the state are generated through direct spending in Sierra County. An additional fourteen jobs, \$642 thousand in labor income, \$1 million in value added and \$1.7 million in output will be generated in the state.

Table 4.1.3

Impact of Capital Expenditures - 2014				
On the Rest of the State from Expenditures in Sierra County				
Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	8.6	\$444,356	\$632,832	\$1,165,185
Induced Effect	5.4	\$197,393	\$361,615	\$585,367
Total Effect	14.1	\$641,749	\$994,447	\$1,750,552

Calculations by Authors Using IMPLAN PRO Version 3

The estimated impacts for the state due to construction and capital expenditures in 2014 are presented in Table 4.1.4.

In addition to the jobs created in the county, 1,156 total jobs consisting of 683 direct jobs, 200 indirect jobs, and 272 indirect jobs will be generated in the state. State wide labor income will increase by over \$50 million, consisting of \$31 million of direct labor income, \$9.5 million of indirect labor income and \$9.6 million of induced labor income. Value added will increase by a total of \$71.2 million and output will increase by \$160 million.

Table 4.1.4

Capital Expenditure Impact - Rest of State - 2014				
ImpactType	Employment	Labor Income	Value Added	Output
Direct Effect	683.2	\$30,987,917	\$39,239,650	\$106,128,329
Indirect Effect	200.6	\$9,465,476	\$14,160,332	\$25,337,448
Induced Effect	272.3	\$9,612,207	\$17,845,096	\$28,715,429
Total Effect	1,156.1	\$50,065,600	\$71,245,078	\$160,181,206

Calculations by Authors Using IMPLAN PRO Version 3

The capital expenditures in the state will have an effect, although relatively small, on Sierra County (see Table 4.1.5). The expenditures in the state will generate less than one job, \$12 thousand in labor income, \$25.7 thousand in value added, and \$53.2 thousand in output.

Table 4.1.5

Capital Expenditure Impact - 2014				
On Sierra County from Expenditures in the Rest of the State				
ImpactType	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	0.0	0.0	0.0
Indirect Effect	0.2	8,201.0	17,104.6	37,504.7
Induced Effect	0.2	4,105.2	8,671.1	15,740.3
Total Effect	0.4	12,306.2	25,775.7	53,245.1

Calculations by Authors Using IMPLAN PRO Version 3

Additional capital expenditures will occur during the life of the mine. These expenditures are for mining equipment, purchased in the state, to replace the initial equipment purchased that has worn out. Table 4.1.6 lists the total impacts of those purchases including the initial impact of purchases in 2014. Direct, Indirect and Induced impacts by year are presented in Appendix B. No capital purchases occur in 2024 or 2025.

Table 4.1.6

Total Impacts by Year on Rest of State				
From Capital Expenditures in the Rest of State				
Year	Date	Employment	Labor Income	Value Added
-1	2014	1,156.1	\$50,065,600	\$71,245,078
1	2015	78.6	\$3,645,606	\$5,364,265
2	2016	10.5	\$488,439	\$718,705
3	2017	0.0	\$0	\$0
4	2018	0.0	\$0	\$0
5	2019	13.4	\$622,960	\$916,644
6	2020	14.5	\$671,463	\$988,013
7	2021	20.5	\$951,610	\$1,400,230
8	2022	17.6	\$817,991	\$1,203,619
9	2023	7.7	\$358,613	\$527,675
10	2024	0.0	\$0	\$0
11	2025	0.0	\$0	\$0

Calculations by Authors Using IMPLAN PRO Version 3

These expenditures will also have an impact on Sierra County. Those impacts are shown in Table 4.1.7. Direct, Indirect and Induced impacts by year are presented in Appendix B.

Table 4.1.7

Total Impacts by Year on Sierra County				
From Capital Expenditures in the Rest of State				
Year	Date	Employment	Labor Income	Value Added
-1	2014	0.4	\$12,306	\$25,776
1	2015	0.0	\$1,420	\$3,716
2	2016	0.0	\$190	\$498
3	2017	0.0	\$0	\$0
4	2018	0.0	\$0	\$0
5	2019	0.0	\$243	\$635
6	2020	0.0	\$262	\$684
7	2021	0.0	\$371	\$970
8	2022	0.0	\$319	\$834
9	2023	0.0	\$140	\$366
10	2024	0.0	\$0	\$0
11	2025	0.0	\$0	\$0

4.2 Operations Impacts

The projected life of the mine is eleven years. While some mining will take place in 2014, full operation will start in 2015 and end in 2025. In 2025 there will be some production, rehabilitation of the site will occur, and the mine is scheduled to close. Average operating expenses over the eleven years are just over \$76 million. Table 4.2.1 presents the total impacts of spending by year for Sierra County.

Table 4.2.1

Total Impacts by Year on Sierra County From Operational Expenditures				
Year	Date	Employment	Labor Income	Value Added
-1	2014	35.6	\$2,642,731	\$11,394,774
1	2015	394.1	\$29,293,337	\$126,305,308
2	2016	397.9	\$29,577,839	\$127,532,007
3	2017	394.1	\$29,294,882	\$126,311,966
4	2018	400.7	\$29,785,151	\$128,425,882
5	2019	407.2	\$30,268,148	\$130,508,438
6	2020	407.2	\$30,268,148	\$130,508,438
7	2021	405.7	\$30,155,679	\$130,023,502
8	2022	384.0	\$28,541,284	\$123,062,648
9	2023	382.7	\$28,446,458	\$122,653,784
10	2024	385.2	\$28,636,110	\$123,471,511
11	2025	328.1	\$24,386,042	\$105,146,318

Calculations by Authors Using IMPLAN PRO Version 3

Direct, indirect, and induced impacts for each year of operations are presented in Appendix B. Average direct employment by the mine over the years is about 246 employees. Payroll and benefits total, on average, just over \$20 million.

The total number of jobs (full and part time) generated in the county varies from 328 to 407 (excluding Year -1, the construction year). Peak yearly impacts occur in 2019 and 2020, years five and six of operations. Labor income varies between \$24.3 million and \$30.3 million. Total value added varies between \$105 million and \$130.5 million.

Table 4.2.2 lists the ten most affected sectors in Sierra County for year 1, 2015. Also shown is the number of jobs generated in each sector due to operational expenditures. All subsequent years affect the local economy in a similar fashion. As expected the mining sector and drinking and eating places are first on the list. The next set of sectors affected is the health care sectors. Retail stores are further down the list.

Table 4.2.2

Top Ten Sectors Affected by Operational Expenditures in Sierra County	
Sector Description	Employment
Mining copper, nickel, lead, and zinc	249.2
Food services and drinking places	19.9
Private hospitals	9.3
Offices of physicians, dentists, and other health practitioners	9.1
Nursing and residential care facilities	8.9
Custom computer programming services	6.7
Civic, social, professional, and similar organizations	6.3
Retail Stores - General merchandise	6.2
Retail Stores - Food and beverage	6.2
Individual and family services	4.3

Calculations by Authors Using IMPLAN PRO Version 3

Table 4.2.3 presents the total impacts of spending by year for the state. Details by year are presented in Appendix B. These impacts are due to the direct spending taking place in the county that spill over to other counties in the state.

Table 4.2.3

Total Impacts by Year on the Rest of the State From Operational Expenditures in Sierra County				
Year	Date	Employment	Labor Income	Value Added
-1	2014	3.9	\$210,796	\$504,117
1	2015	43.2	\$2,336,559	\$5,587,870
2	2016	43.6	\$2,359,252	\$5,642,141
3	2017	43.5	\$2,351,688	\$5,624,051
4	2018	43.9	\$2,375,788	\$5,681,687
5	2019	44.6	\$2,414,314	\$5,773,821
6	2020	44.6	\$2,414,314	\$5,773,821
7	2021	44.5	\$2,405,343	\$5,752,367
8	2022	42.1	\$2,276,572	\$5,444,412
9	2023	41.9	\$2,269,008	\$5,426,323
10	2024	42.2	\$2,284,136	\$5,462,501
11	2025	36.0	\$1,945,133	\$4,651,776

Calculations by Authors Using IMPLAN PRO Version 3

As expected, peak employment, labor income and value added occur in 2019 and 2020. Employment varies between 36 and 45. Labor income varies between \$1.9 million and \$2.4 million. And value added varies between \$1.9 million and \$5.7 million.

5.0 Copper and Taxes in New Mexico

The State of New Mexico imposes several taxes on extractive industries operating in the state. In general, these taxes include the severance tax, the emergency school tax, the resource excise tax, and a processors tax. The copper industry is exempt from the emergency school tax and the resource excise tax. The severance and processors taxes are imposed on the value of production less specified exemptions and deductions. In addition extractive industries are subject to the property tax.

While extractive industries leasing federal or state lands also make royalty payments to the appropriate agency, this is not the case in this instance. Royalty payments are made on leasable minerals not locatable minerals. Generally precious metals are classified as locatable minerals and therefore are not subject to royalty payments.

Copper industry production taxes include the severance tax, the processors tax, and the property tax. These direct production taxes are estimated below for the Copper Flat Mine project.

Future copper production will also produce tax revenue for New Mexico indirectly. The main indirect taxes associated with the industry include the Personal Income Tax (PIT), Corporate Income Tax (CIT), and Gross Receipts Tax (GRT) paid by industry employees on goods and services purchased in the state. The PIT, CIT, and GRT account for more than three-quarters of all state tax revenue. The sales of products resulting from copper production are exempt from gross receipts taxes because the industry pays the resource excise tax.

The severance tax, processors tax, personal income tax, and corporate income tax are all state taxes and revenues go directly to the state. The gross receipts tax is composed of an overall state tax and local government tax. The state collects the tax and distributes the appropriate amounts to local government units. All tax estimates presented below are in 2012 dollars and have been estimated based on current tax rates.

5.1 Direct Taxes: Taxable Value, Rates and Amounts

Tax payments are determined by the statutory tax rates applied to the taxable value of the product produced. The direct taxes are considered to be the severance tax, the resources tax and the processors tax. Since the copper and other minerals are processed in New Mexico and the processors tax will be paid, the producers are exempt from the resources tax. Statutory references on these taxes are provided in Appendix C.

While the property tax is generally not considered a direct tax on production, in this case the property tax is calculated based on production value and, therefore, is included in this discussion.

The statutory tax rates for the severance tax, resource tax, processors tax and property tax are given in Table 5.1.1.

Table 5.1.1

Statutory Tax Rates		
Metal	Tax	Rate (% of Taxable Value)
Copper	Severance Tax	0.50%
	Processors Tax	0.75%
Molybdenum	Severance Tax	0.13%
	Processors Tax	0.13%
Gold	Severance Tax	0.20%
	Processors Tax	0.75%
Silver	Severance Tax	0.20%
	Processors Tax	0.75%

Source: NMSA 7-26-5, Tax rates on severed natural resources except for coal and uranium

The taxable value is based on production value but is defined in different ways for each of the taxes.

Severance tax: Generally, the taxable value for the purposes of the severance tax is a two-step process. First a gross value is determined and then from that gross value there is a deduction for royalty payments. Since no royalties are paid, the severance tax will be based on the gross values. Gross value definitions for copper, molybdenum, gold and silver are presented in Table 5.1.2

Table 5.1.2

Severance Tax: Gross Value Definitions for Minerals

Mineral	Definition
Copper	Sixty-six and two-thirds percent of the sales value less fifty percent of the sales value as a deduction for the expenses of hoisting, loading, crushing, processing and beneficiation.
Molybdenum	Sales value of molybdenum less fifty percent of that value as a deduction for the expenses of hoisting, loading, crushing,
Gold	Sales value less fifty percent of the sales value as a deduction for the expenses of hoisting, loading, crushing, processing and beneficiation
Silver	Eighty percent of the sales value less fifty percent of the sales value as a deduction for the expenses of hoisting, loading, crushing, processing and beneficiation

Source: The gross values of molybdenum, copper, gold and silver are defined, respectfully in parts D, E, F and G of the NM State Statutes 7-26-4

Processors Tax: For the processors tax the taxable value is specified in NM State Statutes 7-25-3. In essence it is the value of the resource minus transportation costs and royalty payments. The authors have assumed transportation costs are minimal and no royalties are paid.

The tax liabilities for the severance and processors taxes are determined by applying the tax rates indicated in Table 5.1.1 to the taxable value.

Property Tax: The value of property for property tax purposes is specified in New Mexico State Statutes 7-39-4 and is known as the Copper Production Ad Valorem Tax Act. Non-operating copper mines are subject to the Property Tax Code and operating copper mines are subject to the Copper Production Ad Valorem Tax in lieu of the property tax.

The types of property to be taxed for non-operating mines (property from which no copper or other minerals were mined or processed during a period of at least twelve months immediately prior to the beginning of the tax year) include improvements, equipment, materials, supplies and other personal property held or used in connection with all classes of mineral property and the surface value for agricultural or other purposes of class one productive or nonproductive mineral property when the surface interest is held in the same ownership as the mineral interests.

For operating mines where the ore is mined for processing in a concentrator, the valuation for property tax purposes is equal to thirty percent of the value of salable copper and other minerals contained in the concentrate.

For a non-operating mine the value of the property will be taxed at the normal non-residential, in county, rate of 23.009 mils. For operating mines, the tax rate is to be determined through an agreement by the county assessor and the owners of the mine. This rate will generally be fairly close to the regular county rate. For the purposes of this analysis the mil rate used is 23.009.

Since the amount of taxes paid is based on the value of salable mineral, an assumption must be made on what the price of the minerals produced will be. For the purposes of this analysis, Table 5.1.3 lists the assumed prices of copper, molybdenum, gold and silver.

Table 5.1.3

Metal Prices	
Copper (\$/lb)	\$3.00
Molybdenum (\$/lb)	\$12.00
Gold (\$/oz)	\$1,350.00
Silver (\$/oz)	\$25.00

Estimates of the value of production and the amount of severance taxes, processor's taxes and property taxes paid per year of operation are presented in Table 5.1.4. During the life of the mine, severance taxes will total almost \$1.7 million, the processor's tax will total almost \$14.6 million and the property tax will total almost \$6.6 million.

Table 5.1.4

Severance Taxes, Processor's Tax, and Property Tax by Year					
Year	Date	Value of Minerals	Severance Tax	Processor's Tax	Property Tax*
1	2015	\$237,014,270	\$194,306	\$1,684,760	\$2,107,248
2	2016	\$247,012,996	\$201,724	\$1,748,366	\$544,801
3	2017	\$182,378,983	\$150,840	\$1,307,041	\$567,784
4	2018	\$204,567,876	\$168,526	\$1,464,771	\$419,216
5	2019	\$224,824,104	\$184,037	\$1,590,635	\$470,220
6	2020	\$179,460,370	\$147,859	\$1,276,194	\$516,780
7	2021	\$141,801,550	\$116,626	\$1,024,757	\$412,507
8	2022	\$153,196,498	\$125,576	\$1,094,717	\$325,945
9	2023	\$177,509,901	\$146,689	\$1,261,566	\$352,137
10	2024	\$192,095,471	\$157,585	\$1,347,705	\$408,024
11	2025	\$119,644,622	\$98,046	\$836,457	\$441,550
Total		\$2,059,506,642	\$1,691,812	\$14,636,969	\$6,566,213

*Property Taxes are based on the previous year mineral values except in year one when the tax is based on the value of improvements, equipment, materials, supplies and other personal property of non-operating mine.

Calculations by author

5.2 Taxes based on Labor Income:

The construction and operations of the Copper Flat will also generate state tax revenue because employees whose jobs depend on the new activity will earn and spend income. This applies to those who work directly for NMCC (including contractor employees during construction) and those workers who earn and spend income as a result of the direct and indirect effects of plant construction and on-going operations.

In New Mexico these taxes include Gross Receipts Taxes (GRT), Personal Income Taxes (PIT), Corporate Income taxes (CIT) and a broad category called other taxes. Combined, GRT, PIT, and CIT account for 77 percent of all New Mexico Tax revenue. The other tax category consists primarily of revenue from the severance tax, the resources excise tax, the school tax, and property tax. The other applicable taxes have been have been reported separately.

The tax revenue calculations in this report are based on effective tax rates averaged over the 2001 to 2009 period (latest available data). The main reason for using effective tax rates instead of statutory rates is to avoid the nearly impossible task of estimating deductions and exemptions. The effective tax rates used here represent the proportion of labor income actually paid by New Mexicans on average between 2001 and 2009. For detail on the calculation of these effective rates, see Appendix D. Revenue Estimation Methodology. The effective tax rates used in this study are 4.781% for the Gross Receipts Tax, 2.21% for the Personal Income Tax, and .502% for the Corporate Income Tax.

5.2.1 GRT, PIT, CIT and Compensating Taxes from Construction

The estimated gross receipts, personal income, corporate income, and compensating tax revenues based on labor income are presented separately for the construction phase of the project and the operations phase.

The Gross Receipts Tax is a tax on the privilege of doing business. When a person purchases an item the Gross Receipts Tax is paid by the seller. If a business purchases items from out of state, the state of New Mexico has no jurisdiction over the seller. The compensating tax was created to allow the state to levy a gross receipts tax on these transactions. When a business buys from out of state they are liable for the compensating tax. Because the company doing the construction will be, most likely, from out of state, and the mine and plant equipment will originate from out of state, NMCC will be liable for the compensating tax on the dollar value of those expenditures. This compensating tax, levied at a rate of 5.125% is collected by the state and all revenues remain at the state level. The compensating tax will apply when NMCC purchases capital equipment from outside the state.

The construction period tax impacts are presented in Table 5.2.1.1. The personal income is calculated from all impacts (County and State) during the construction period.

Table 5.2.1.1

Tax Revenues From Construction and Capital Expenditures

Year	Date	Labor Income	Gross Receipts Tax	Personal Income Tax	Corporate Income Tax	Compensating Tax
-1	2014	\$55,647,008	\$2,660,483	\$1,229,799	\$279,348	\$8,345,699
1	2015	\$3,647,026	\$174,364	\$80,599	\$18,308	\$78,663
2	2016	\$488,629	\$23,361	\$10,799	\$2,453	\$638,964
3	2017	\$0	\$0	\$0	\$0	\$0
4	2018	\$0	\$0	\$0	\$0	\$518,910
5	2019	\$623,203	\$29,795	\$13,773	\$3,128	\$0
6	2020	\$671,725	\$32,115	\$14,845	\$3,372	\$0
7	2021	\$951,981	\$45,514	\$21,039	\$4,779	\$340,893
8	2022	\$818,310	\$39,123	\$18,085	\$4,108	\$0
9	2023	\$358,753	\$17,152	\$7,928	\$1,801	\$0
10	2024	\$0	\$0	\$0	\$0	\$469,490
11	2025	\$0	\$0	\$0	\$0	\$0
Total		\$63,206,634	\$3,021,909	\$1,396,867	\$317,297	\$10,392,620

Calculations by Authors

Over the life of the mine, construction and capital expenditures will generate \$3 million in Gross Receipts Taxes, \$1.4 million in Personal Income Taxes, \$.3 million in Corporate Income Taxes and \$10.4 million in Compensating taxes. Over 80% of the tax receipts occur in Year -1 (2014).

5.2.2 GRT, PIT, and CIT Taxes from Operations

Gross Receipts Taxes, Personal Income Taxes, and Corporate Income Taxes generated from labor income in the operations phase by year are summarized in Table 5.2.2.1. Some operational spending takes place in year -1, the construction phase, and the impacts are included here. The amount of tax revenue generated is from both the state and county level impacts. Over the life of the mine, a total of \$16.6 million in gross receipts taxes will be generated, \$7.7 million in personal income taxes will be generated and \$1.7 million in corporate income taxes will be generated.

Table 5.2.2.1

Tax Revenues From Operational Expenditures

Year	Date	Labor Income	Gross Receipts Tax	Personal Income Tax	Corporate Income Tax
-1	2014	\$2,853,527	\$136,427	\$63,063	\$14,325
1	2015	\$31,629,896	\$1,512,225	\$699,021	\$158,782
2	2016	\$31,937,092	\$1,526,912	\$705,810	\$160,324
3	2017	\$31,646,569	\$1,513,022	\$699,389	\$158,866
4	2018	\$32,160,939	\$1,537,615	\$710,757	\$161,448
5	2019	\$32,682,462	\$1,562,548	\$722,282	\$164,066
6	2020	\$32,682,462	\$1,562,548	\$722,282	\$164,066
7	2021	\$32,561,022	\$1,556,742	\$719,599	\$163,456
8	2022	\$30,817,856	\$1,473,402	\$681,075	\$154,706
9	2023	\$30,715,467	\$1,468,506	\$678,812	\$154,192
10	2024	\$30,920,245	\$1,478,297	\$683,337	\$155,220
11	2025	\$26,331,175	\$1,258,893	\$581,919	\$132,182
Total		\$346,938,712	\$16,587,140	\$7,667,346	\$1,741,632

Calculations by Authors

5.2.3 Tax Distributions to Local Government Units

While the GRT as estimated above is collected by the state, a portion of the tax revenue is distributed to the local government units where the sale took place. For the county impacts, these local government units in Sierra County include Truth or Consequences, the Truth or Consequences Airport District, Elephant Butte, Williamsburg and the County government itself. For the state impacts, it would be in the local government unit in which the sale took place. Each of these government entities has different GRT rates and the distributions to them vary according to those individual rates as well as the standard state disbursement rate.

Since it is not possible to estimate where in Sierra County, or the state, expenditures that generate GRT will occur, an average disbursement rate of 40% is used. This disbursement rate is a rule of thumb often used by state administrators. Computations by the authors for a number of counties have come very close to this proportion. There is no local government distribution from compensating tax collection.

Table 5.2.3.1 presents the distribution of GRT to local government units. Over the life of the mine, Sierra County will receive over \$6.2 million and other local government units around the state will receive over \$1.6 million. After the distribution the state will retain about \$11.8 million.

Table 5.2.3.1

Distribution of GRT to State, Other Counties, and Sierra County

Year	Date	To			Total GRT
		To State	Counties in Rest of	To Sierra County	
-1	2014	\$1,678,146	\$973,759	\$145,006	\$2,796,911
1	2015	\$1,011,954	\$114,403	\$560,233	\$1,686,590
2	2016	\$930,164	\$54,459	\$565,650	\$1,550,274
3	2017	\$907,813	\$44,974	\$560,235	\$1,513,022
4	2018	\$922,569	\$45,435	\$569,611	\$1,537,615
5	2019	\$955,406	\$58,085	\$578,853	\$1,592,344
6	2020	\$956,798	\$59,012	\$578,853	\$1,594,664
7	2021	\$961,354	\$64,198	\$576,704	\$1,602,257
8	2022	\$907,515	\$59,180	\$545,830	\$1,512,525
9	2023	\$891,395	\$50,251	\$544,013	\$1,485,658
10	2024	\$886,978	\$43,682	\$547,637	\$1,478,297
11	2025	\$755,336	\$37,199	\$466,359	\$1,258,893
Total		\$11,765,429	\$1,604,636	\$6,238,983	\$19,609,049

Calculation by Authors

6.0 Conclusions

NMCC plans to spend \$300 million on construction and capital equipment to open the Copper Flat Mine. Other capital equipment will be purchased during the operation phase. During the eleven years of operation, the average expenditures will be just under \$76 million.

The capital expenditures will generate over 181 jobs in Sierra County. An additional 1,170 jobs will occur in the state. The 181 jobs generated in the county is equal to the average number of unemployed (181) in the county from 2005-2009.

The operational expenditures will generate between 328 and 407 jobs each of the eleven years the mine is operating. Another 36 to 44 jobs will be generated in the state. The operational jobs generated in the county are also larger than the average number of unemployed.

Over the years of operation, the mine will generate \$1.7 million in severance taxes, \$14.6 million in processor's tax and pay to the county \$6.6 million in property taxes. In addition, \$19.6 million gross receipts taxes, \$10.3 million in compensating taxes, \$9 million in personal income tax and \$2 million in corporate tax will be generated. Of the \$19.6 million in gross receipts taxes generated, \$6.2 million will be distributed to Sierra County and \$1.6 million will be distributed to other counties in the state.

APPENDICES

Appendix A: The Methods of Economic Impact Analysis

Economic impact analysis is an attempt to measure the net change in economic activity in a given geographic area that results from a change in economic activity. Often, the change in economic activity refers to new spending or employment associated with a new business or a business expansion. The same general techniques can be used to assess a contraction of economic activity such as the closure of a military base or an industrial plant. The main idea behind economic impact analysis is that a new dollar spent in a local area results in more than one dollar in economic activity in the area.

Commonly used modeling systems to perform economic impact analysis are: RIMS II, REMI, and IMPLAN. All three modeling systems are based on the national input-output model produced by the Bureau of Economic Analysis (BEA). The national model is scaled to state and county areas by the providers of the models. The three main regional models differ in their approach to scaling the national model, the number and type of variables included, and in the software provided.

The RIMS II (regional input-output modeling system) system is produced by the U.S. Department of Commerce, Bureau of Economic Analysis (<http://www.bea.gov/regional/rims/index.cfm>). The REMI models are privately produced and customized to user specified geography by REMI (Regional Economic Models), Inc. (<http://www.remi.com/>). The IMPLAN model was originally developed for the U.S. Forest Service but for many years it has been maintained and sold by the Minnesota Implan Group, Inc. (<http://www.implan.com/>). The model used to produce the estimates in this report is IMPLAN PRO Version 3 with the latest data and structural matrices available.

Economic impacts are generally measured in terms of changes in output, value added, labor income, and employment. Output is measured in dollars and corresponds roughly to gross sales. Goods and services used to produce other goods and services are known as intermediate goods. Value added excludes intermediate goods and services. Gross domestic product (GDP) is a value added concept. In brief, output counts some production more than once while value added does not. Value added can be thought of as the local or regional counterpart to Gross Domestic Product (GDP).

Labor income, also measured in dollars, consists of wages and salaries including benefits and proprietors income. Employment is measured in terms of numbers of jobs. Jobs refer to both full and part-time employment. In many impact studies including this one, estimates of changes in federal, state and local taxes as a result of the new economic activity are also presented.

In most economic impact studies, three types of impacts are estimated: direct, indirect and induced. A hypothetical example of each type of impact can be given by considering what happens when a new mining operation (e.g., a mill) is opened. In this example, only the construction phase of a hypothetical new mill that will cost \$100 million will be considered. It is assumed that the \$100 million investment in the mill is from outside the local area.

The direct effect on output of the new mill is the \$100 million that will be spent on construction. The \$100 million spent on construction can be placed into several categories as illustrated in Figure A.1. In this highly simplified diagram, the expenditures in the five categories sum to the total cost (new spending) of the mill.

The process, however, is far from complete. Consider, for example, the \$50 million in materials supplied by the building materials industry to the project. In order to supply these direct inputs to the project, the building materials industry purchases many additional inputs. Some of these inputs are obvious and include such items as concrete, steel, and other materials. Some of the inputs are not so obvious. The building materials industry may also purchase accounting services, consume electricity, and expand its storage facilities in order to get the job done. These inputs purchased by the building materials industry will, in turn, generate additional expenditures by the firms or industries that supplied them. This process is illustrated in Figure A.2. The combined expenditures are known as indirect effects.

Finally, additional spending by households will be generated by the project because workers on the project receive wage and salary income. The additional household spending is known as an induced effect.

This all sounds simple enough. There are only three basic ideas. First, a new dollar of spending (the direct effect) in a given area will generate more than a single dollar's worth of new economic activity in that area. Second, all industries purchase inputs from other industries (the indirect effects). Third, households will spend additional income generated from the new economic activity (induced effects).

There are three main areas of concern in estimating local economic impacts. First, the new spending must, in fact, be new to the geographic area being considered. In the example above, the \$100 million investment in the mill is assumed to be from outside the area. Second, the size of the local economy matters. To the extent that the direct inputs are imported from other areas, new spending doesn't do much for the local economy. In general, the smaller the local economy under consideration, the more likely it is for firms operating locally to obtain inputs from outside the area. Third, supply constraints in the local economy are important. All three areas of concern will be addressed appropriately in the discussion of results.

Given knowledge of a pattern of new spending, the direct, indirect, and induced effects of that spending can be computed using input-output models (and occasionally other techniques).

Figure A.1 Direct Effects Illustrated

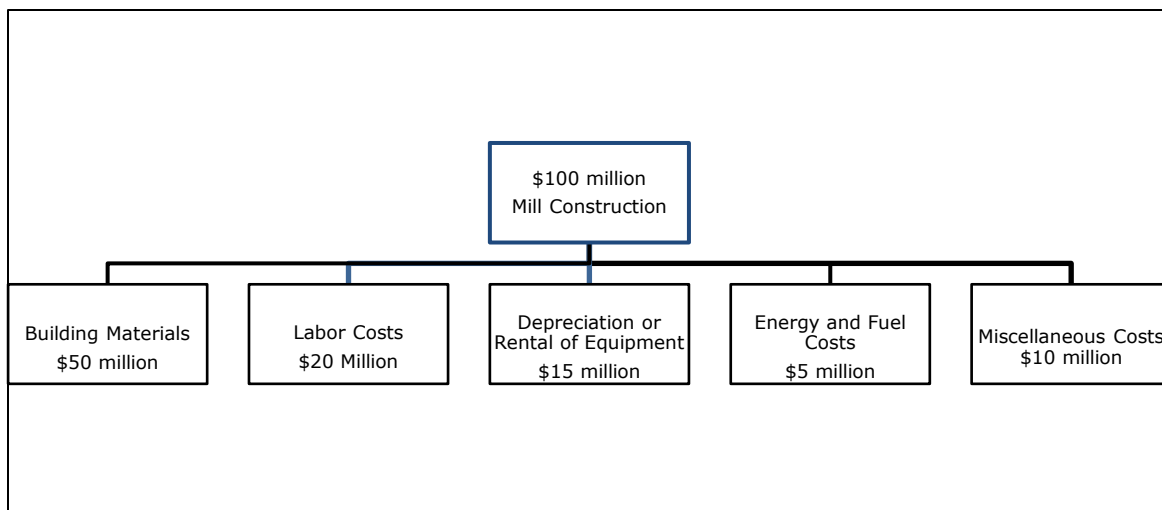
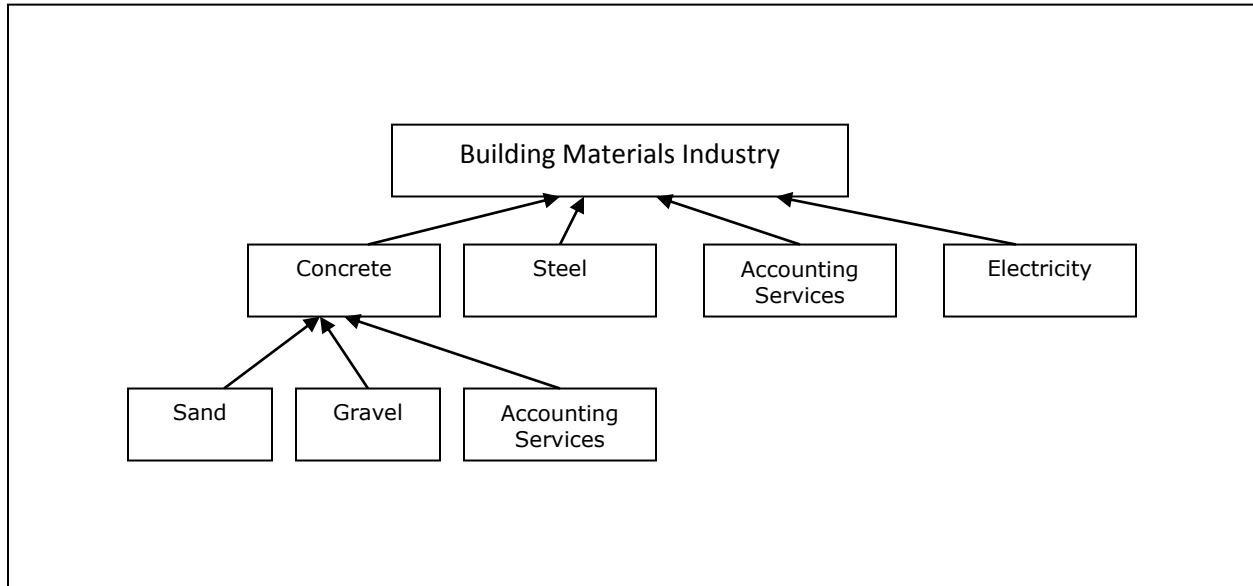


Figure A.2 Indirect Effects Illustrated



About Multipliers

Most economic impact studies involve the use of multipliers. A multiplier reflects the idea that a new dollar of spending in an economy generates more than a dollar’s worth of economic activity. The multipliers used in economic impact studies are industry specific. That is, there is no single multiplier for all industries. The multipliers are also specific to a particular geographic area (county, state, or nation) and reflect the structure of the economy of that area. Multipliers can be calculated for a variety of economic variables such as output, income, or employment.

Multipliers are almost always larger for larger economies than for smaller economies. In this context, “larger” refers to geographic area and or/population. Larger economies are more likely to produce the wide range of inputs needed by industries. That is, larger economies tend to be more self-sufficient in the production of inputs, while smaller economies tend to import a greater share of their inputs. Table A.1 below displays total output multipliers for selected industries for the U.S., N.M., and Eddy County, N.M. Total output multipliers reflect the direct, indirect, and induced effects of new economic activity in a given industry. As shown in Table A.1, the larger the economy, the larger the multiplier.

Table A.1

Output Multiplier Comparisons				
IMPLAN SECTOR	Description	US	NM	Eddy County
27	Mining and quarrying other nonmetallic mineral:	2.5498	1.4263	1.2438
37	Construction of new residential Structures	3.0142	1.6006	1.3454
411	Hotels and motels, including casino hotels	2.6344	1.6284	1.3377
	Average all sectors	2.8924	1.5059	1.3348
	Number of sectors in average	432	356	154

Source: IMPLAN PRO Version 3.1.2, December 2010

How large are total output multipliers? There is no easy answer to this question because multipliers differ by the size and structure of the economy under consideration. However, you should always be suspicious of a state or local total output multiplier greater than 3.0. Sometimes analysts who are attempting to promote a particular activity simply make up a number to be used as a multiplier without the benefit of an economic model or other form of economic analysis. For reference purposes, we have listed the ten industries with the largest total output multipliers for New Mexico (Table A.2) and Eddy County (Table A.3) based on the IMPLAN (2009) modeling system in Table A.2.

Table A.2
New Mexico: Largest 10 Total Output Multipliers (2009)

Implan Sector	Description	Total Output Multiplier
429	Other Federal Government enterprises	2.4181
430	State and local government passenger transit	2.2544
4	Fruit farming	2.1047
16	Commercial logging	2.0314
95	Sawmills and wood preservation	1.9859
348	Radio and television broadcasting	1.9641
372	Computer systems design services	1.9519
3	Vegetable and melon farming	1.9248
56	Cheese manufacturing	1.9025
404	Promoters of performing arts and sports and agents for public figures	1.9002

Source: Author Rankings from IMPLAN PRO Version 3.0

Employment multipliers are generally measured in different units than total output multipliers. Typically employment multipliers are presented as jobs required per \$1,000,000 of new expenditures or sales in a given industry. As an example, the direct effect employment multiplier for mining and quarrying of non-metallic minerals (IMPLAN Sector 27) in New Mexico is 2.51 while the total employment multiplier for that industry is 4.36. The interpretation of these numbers is straightforward. A \$1 million increase in economic activity in IMPLAN sector 27 leads to an additional 2.51 jobs in that sector. When the indirect and induced effects are considered, the \$1 million increase in mining activity leads to 4.36 additional jobs including the 2.51 direct jobs already mentioned.

Advantages and Disadvantages of I-O models:

The advantages and disadvantages of I-O models are well known. First and perhaps the most important advantage of I-O models is that they are based on detailed inter-industry relationships. This allows us to examine the effects of a change in one industry on other industries. Second, I-O models allow analysts to examine both the direct and indirect effects of a change in economic activity. Third, I-O models are relatively easy to understand. Fourth, after the basic transactions table has been constructed, I-O models are relatively inexpensive to use. Fifth, I-O models can be modified. For example, the national input-output models can be scaled to a different geographic level such as a state or a county.

I-O models can also be modified to take into account a new industry. Finally, the results of I-O models can be reconciled with other familiar measures of economic activity such as GDP.

There are also several disadvantages or limitations of I-O models. First, I-O models are initially very expensive to construct and doing so takes a long time (years). Second, I-O models use linear production functions. This means that I-O models have constant returns to scale (doubling all inputs results in a doubling of output), while many modern industries exhibit increasing returns to scale. Third, the coefficients of I-O models are based on a given set of relative prices that are assumed not to change during the projection period. If, for example, energy prices increase substantially after the model is constructed, the model will not reflect the tendency of industry to reduce energy use through more energy efficient production techniques or equipment. Fourth, the relationships expressed in I-O models are based on the technology used at the time the model was constructed. Rapid changes in technology will not be appropriately accounted for in the models. Fifth, regional (state and county) I-O models are generally derived from the national models and may not adequately capture specific regional inter-industry relationships. Finally, separate final demand projections (from outside the model) are generally needed to perform useful analysis. These exogenous projections may themselves be problematic.

The advantages of I-O models far outweigh the disadvantages and I-O models remain the single most widely used technique for estimating the impacts of regional policy and industry changes. No other modeling approach captures the many complex relationships among industries and ultimate consumers as well as I-O models.

Appendix B: Direct, Indirect and Induced Impacts by Year

Construction and Capital Impacts by Year on the Rest of the State from Expenditures in the Rest of the State – Year 1, 2015 to Year 9, 2023

Capital Expenditure Impact - Rest of State

Year 1

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	33.8	\$1,782,408	\$2,168,096	\$12,987,000
Indirect Effect	24.9	\$1,161,604	\$1,893,225	\$3,540,372
Induced Effect	19.9	\$701,594	\$1,302,944	\$2,096,221
Total Effect	78.6	\$3,645,606	\$5,364,265	\$18,623,594

Capital Expenditure Impact - Rest of State

Year 2

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	4.5	\$238,807	\$290,482	\$1,740,000
Indirect Effect	3.3	\$155,632	\$253,655	\$474,340
Induced Effect	2.7	\$94,000	\$174,569	\$280,852
Total Effect	10.5	\$488,439	\$718,705	\$2,495,192

Capital Expenditure Impact - Rest of State

Year 5

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	5.8	\$304,577	\$370,484	\$2,219,214
Indirect Effect	4.3	\$198,495	\$323,514	\$604,978
Induced Effect	3.4	\$119,888	\$222,647	\$358,202
Total Effect	13.4	\$622,960	\$916,644	\$3,182,393

Capital Expenditure Impact - Rest of State

Year 6

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	6.2	\$328,292	\$399,329	\$2,392,002
Indirect Effect	4.6	\$213,949	\$348,702	\$652,081
Induced Effect	3.7	\$129,223	\$239,982	\$386,091
Total Effect	14.5	\$671,463	\$988,013	\$3,430,174

Capital Expenditure Impact - Rest of State

Year 7

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	8.8	\$465,261	\$565,937	\$3,389,987
Indirect Effect	6.5	\$303,213	\$494,187	\$924,141
Induced Effect	5.2	\$183,137	\$340,107	\$547,175
Total Effect	20.5	\$951,610	\$1,400,230	\$4,861,303

Capital Expenditure Impact - Rest of State

Year 8

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	7.6	\$399,932	\$486,471	\$2,913,987
Indirect Effect	5.6	\$260,637	\$424,796	\$794,379
Induced Effect	4.5	\$157,422	\$292,351	\$470,344
Total Effect	17.6	\$817,991	\$1,203,619	\$4,178,710

Capital Expenditure Impact - Rest of State

Year 9

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	3.3	\$175,333	\$213,273	\$1,277,513
Indirect Effect	2.4	\$114,265	\$186,234	\$348,262
Induced Effect	2.0	\$69,015	\$128,169	\$206,202
Total Effect	7.7	\$358,613	\$527,675	\$1,831,977

Construction and Capital Impacts on Sierra County from Expenditures in the Rest of the State– Year 1, 2015 to Year 9, 2023

Capital Expenditure Impacts - on Sierra County from Rest of State

Year 1

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	0.0	\$1,070	\$2,976	\$5,558
Induced Effect	0.0	\$350	\$740	\$1,331
Total Effect	0.0	\$1,420	\$3,716	\$6,889

Capital Expenditure Impacts - on Sierra County from Rest of State

Year 2

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	0.0	\$143	\$399	\$745
Induced Effect	0.0	\$47	\$99	\$178
Total Effect	0.0	\$190	\$498	\$923

Capital Expenditure Impacts - on Sierra County from Rest of State

Year 5

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	0.0	\$183	\$509	\$950
Induced Effect	0.0	\$60	\$126	\$227
Total Effect	0.0	\$243	\$635	\$1,177

Capital Expenditure Impacts - on Sierra County from Rest of State

Year 6

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	0.0	\$197	\$548	\$1,024
Induced Effect	0.0	\$64	\$136	\$245
Total Effect	0.0	\$262	\$684	\$1,269

Capital Expenditure Impacts - on Sierra County from Rest of State

Year 7

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	0.0	\$279	\$777	\$1,451
Induced Effect	0.0	\$91	\$193	\$347
Total Effect	0.0	\$371	\$970	\$1,798

Capital Expenditure Impacts - on Sierra County from Rest of State

Year 8

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	0.0	\$240	\$668	\$1,247
Induced Effect	0.0	\$78	\$166	\$299
Total Effect	0.0	\$319	\$834	\$1,546

Capital Expenditure Impacts - on Sierra County from Rest of State

Year 9

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	0.0	\$105	\$293	\$547
Induced Effect	0.0	\$34	\$73	\$131
Total Effect	0.0	\$140	\$366	\$678

Impacts by Year on Sierra County from Operational Expenditures in Sierra County – Year -1, 2014 to Year 11, 2025

Sierra County - Operational Expenditure Impacts

Year -1

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	22.5	\$2,289,722	\$10,676,889	\$13,039,046
Indirect Effect	2.3	\$80,522	\$144,583	\$307,213
Induced Effect	10.7	\$272,488	\$573,302	\$979,483
Total Effect	35.6	\$2,642,731	\$11,394,774	\$14,325,742

Sierra County - Operational Expenditure Impacts

Year 1

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	249.2	\$25,380,408	\$118,347,914	\$144,531,238
Indirect Effect	25.9	\$892,542	\$1,602,634	\$3,405,302
Induced Effect	118.9	\$3,020,388	\$6,354,761	\$10,857,075
Total Effect	394.1	\$29,293,337	\$126,305,308	\$158,793,614

Sierra County - Operational Expenditure Impacts

Year 2

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	251.6	\$25,626,907	\$119,497,329	\$145,934,951
Indirect Effect	26.2	\$901,211	\$1,618,199	\$3,438,374
Induced Effect	120.1	\$3,049,723	\$6,416,479	\$10,962,520
Total Effect	397.9	\$29,577,839	\$127,532,007	\$160,335,846

Sierra County - Operational Expenditure Impacts

Year 3

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	249.2	\$25,381,746	\$118,354,152	\$144,538,857
Indirect Effect	25.9	\$892,589	\$1,602,718	\$3,405,481
Induced Effect	119.0	\$3,020,548	\$6,355,096	\$10,857,647
Total Effect	394.1	\$29,294,882	\$126,311,966	\$158,801,985

Sierra County - Operational Expenditure Impacts

Year 4

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	253.4	\$25,806,527	\$120,334,889	\$146,957,812
Indirect Effect	26.3	\$907,527	\$1,629,541	\$3,462,474
Induced Effect	120.9	\$3,071,099	\$6,461,453	\$11,039,357
Total Effect	400.7	\$29,785,151	\$128,425,882	\$161,459,643

Sierra County - Operational Expenditure Impacts

Year 5

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	257.5	\$26,225,006	\$122,286,241	\$149,340,882
Indirect Effect	26.8	\$922,244	\$1,655,965	\$3,518,622
Induced Effect	122.9	\$3,120,900	\$6,566,232	\$11,218,371
Total Effect	407.2	\$30,268,148	\$130,508,438	\$164,077,875

Sierra County - Operational Expenditure Impacts

Year 6

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	257.5	\$26,225,006	\$122,286,241	\$149,340,882
Indirect Effect	26.8	\$922,244	\$1,655,965	\$3,518,622
Induced Effect	122.9	\$3,120,900	\$6,566,232	\$11,218,371
Total Effect	407.2	\$30,268,148	\$130,508,438	\$164,077,875

Sierra County - Operational Expenditure Impacts

Year 7

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	256.5	\$26,127,560	\$121,831,856	\$148,785,969
Indirect Effect	26.7	\$918,817	\$1,649,812	\$3,505,547
Induced Effect	122.4	\$3,109,303	\$6,541,833	\$11,176,687
Total Effect	405.7	\$30,155,679	\$130,023,502	\$163,468,203

Sierra County - Operational Expenditure Impacts

Year 8

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	242.8	\$24,728,812	\$115,309,545	\$140,820,660
Indirect Effect	25.2	\$869,628	\$1,561,489	\$3,317,877
Induced Effect	115.9	\$2,942,845	\$6,191,614	\$10,578,339
Total Effect	384.0	\$28,541,284	\$123,062,648	\$154,716,875

Sierra County - Operational Expenditure Impacts

Year 9

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	242.0	\$24,646,653	\$114,926,441	\$140,352,797
Indirect Effect	25.2	\$866,738	\$1,556,301	\$3,306,853
Induced Effect	115.5	\$2,933,068	\$6,171,043	\$10,543,193
Total Effect	382.7	\$28,446,458	\$122,653,784	\$154,202,844

Sierra County - Operational Expenditure Impacts

Year 10

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	243.6	\$24,810,971	\$115,692,649	\$141,288,522
Indirect Effect	25.3	\$872,517	\$1,566,677	\$3,328,900
Induced Effect	116.3	\$2,952,623	\$6,212,185	\$10,613,484
Total Effect	385.2	\$28,636,110	\$123,471,511	\$155,230,907

Sierra County - Operational Expenditure Impacts

Year 11

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	207.5	\$21,128,617	\$98,521,966	\$120,318,993
Indirect Effect	21.6	\$743,021	\$1,334,156	\$2,834,837
Induced Effect	99.0	\$2,514,405	\$5,290,195	\$9,038,270
Total Effect	328.1	\$24,386,042	\$105,146,318	\$132,192,099

Impact by Year on the Rest of the State from Operational Expenditures in Sierra County – Year -1, 2014 to Year 11, 2025

Rest of the State - Operational Expenditure Impacts

Year -1

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	1.7	\$128,854	\$354,643	\$510,804
Induced Effect	2.2	\$81,941	\$149,474	\$242,437
Total Effect	3.9	\$210,796	\$504,117	\$753,241

Rest of the State - Operational Expenditure Impacts

Year 1

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	18.4	\$1,428,282	\$3,931,028	\$5,661,999
Induced Effect	24.7	\$908,278	\$1,656,843	\$2,687,287
Total Effect	43.2	\$2,336,559	\$5,587,870	\$8,349,285

Rest of the State - Operational Expenditure Impacts

Year 2

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	18.5	\$1,442,154	\$3,969,207	\$5,716,989
Induced Effect	25.0	\$917,099	\$1,672,935	\$2,713,386
Total Effect	43.6	\$2,359,252	\$5,642,141	\$8,430,375

Rest of the State - Operational Expenditure Impacts

Year 3

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	18.5	\$1,437,530	\$3,956,481	\$5,698,659
Induced Effect	24.9	\$914,159	\$1,667,571	\$2,704,686
Total Effect	43.5	\$2,351,688	\$5,624,051	\$8,403,345

Rest of the State - Operational Expenditure Impacts

Year 4

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	18.7	\$1,452,262	\$3,997,028	\$5,757,059
Induced Effect	25.1	\$923,527	\$1,684,660	\$2,732,404
Total Effect	43.9	\$2,375,788	\$5,681,687	\$8,489,464

Rest of the State - Operational Expenditure Impacts

Year 5

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	19.0	\$1,475,812	\$4,061,843	\$5,850,416
Induced Effect	25.5	\$938,503	\$1,711,979	\$2,776,713
Total Effect	44.6	\$2,414,314	\$5,773,821	\$8,627,129

Rest of the State - Operational Expenditure Impacts

Year 6

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	19.0	\$1,475,812	\$4,061,843	\$5,850,416
Induced Effect	25.5	\$938,503	\$1,711,979	\$2,776,713
Total Effect	44.6	\$2,414,314	\$5,773,821	\$8,627,129

Rest of the State - Operational Expenditure Impacts

Year 7

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	18.9	\$1,470,328	\$4,046,751	\$5,828,677
Induced Effect	25.5	\$935,016	\$1,705,617	\$2,766,396
Total Effect	44.5	\$2,405,343	\$5,752,367	\$8,595,073

Year 8

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	17.9	\$1,391,613	\$3,830,106	\$5,516,637
Induced Effect	24.1	\$884,960	\$1,614,307	\$2,618,296
Total Effect	42.1	\$2,276,572	\$5,444,412	\$8,134,933

Rest of the State - Operational Expenditure Impacts

Year 9

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	17.8	\$1,386,990	\$3,817,381	\$5,498,309
Induced Effect	24.0	\$882,019	\$1,608,943	\$2,609,597
Total Effect	41.9	\$2,269,008	\$5,426,323	\$8,107,905

Rest of the State - Operational Expenditure Impacts

Year 10

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	18.0	\$1,396,237	\$3,842,832	\$5,534,966
Induced Effect	24.2	\$887,900	\$1,619,670	\$2,626,995
Total Effect	42.2	\$2,284,136	\$5,462,501	\$8,161,960

Rest of the State - Operational Expenditure Impacts

Year 11

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	0.0	\$0	\$0	\$0
Indirect Effect	15.3	\$1,189,013	\$3,272,492	\$4,713,486
Induced Effect	20.6	\$756,121	\$1,379,284	\$2,237,106
Total Effect	36.0	\$1,945,133	\$4,651,776	\$6,950,592

Appendix C: Statutory References for Valuation under the Severance Tax, Processors Tax and Property Tax

Resource Tax

Statutory exemption from the resource tax:

“Exempted from the resources tax is the taxable value of any natural resource that is processed in New Mexico and on whose taxable value the processors tax is paid.” (2010 NMSA 1978/Statutory Chapters in New Mexico Statutes Annotated 1978/CHAPTER 7 Taxation /ARTICLE 25 Resources Excise Tax /7-25-7. Exemption; resources tax. (1966))

Severance Tax

The gross values of molybdenum, copper, gold and silver are defined, respectfully in parts D, E, F and G of the NM State Statutes 7-26-4 as:

D. The gross value for each type of molybdenum and molybdenum product requiring processing or beneficiation, regardless of the form in which the product is actually sold, shall be the value of molybdenum contained in concentrates shipped or sold from a mine site, but in no event a value less than the value that bona fide sales which reflect current market conditions would yield for the same quantity of molybdenum products contained in concentrates at the mine site, less fifty percent of that value as a deduction for the expenses of hoisting, loading, crushing, processing and beneficiation.

E. The gross value for copper, lead and zinc shall be sixty-six and two-thirds percent of the sales value established from published price data, as further described in this subsection, of the quantity of copper, lead or zinc recoverable from the concentrate or other product which is sold or is shipped, transmitted or transported out of New Mexico without sale, less fifty percent of the sales value as a deduction for the expenses of hoisting, loading, crushing, processing and beneficiation. For purposes of this subsection, the taxable event occurs when the severer sells copper, lead or zinc in New Mexico or when the severer ships, transmits or transports copper, lead or zinc out of New Mexico without first making sale of it. The secretary shall designate by regulation which published price index shall be used to establish the sales value for each resource. The sales value for each resource shall be the monthly average price published for each resource for the month in which the taxable event occurs. When the taxable event is sale, the recoverable quantity of copper, lead or zinc shall be reported as the provisional quantity determined by presale assay, and the reported quantity may be adjusted in a report filed after final assay, if necessary. When the taxable event is shipment, transmission or transportation out of New Mexico without sale, the recoverable quantity of copper, lead or zinc shall be reported as the provisional quantity determined after preshipment assay. Copper, lead or zinc shall not be considered saved for the purposes of the Severance Tax Act [7-26-1 NMSA 1978] unless the copper, lead or zinc can economically be separated and saved from the dominant resource, which is the resource subject to sale by the severer. Any copper, lead or zinc the value of which is

computed under this subsection shall not also have its value computed by the use of any of the provisions of Subsection B of this section.

F. The gross value for gold shall be the sales value established from published price data, as further described in this subsection, of the quantity of gold recoverable from the concentrate or other product which is sold or is shipped, transmitted or transported out of New Mexico without sale, less fifty percent of the sales value as a deduction for the expenses of hoisting, loading, crushing, processing and beneficiation. For purposes of this subsection, the taxable event occurs when the severer sells gold in New Mexico or when the severer ships, transmits or transports gold out of New Mexico without first making sale of it. The secretary shall designate by regulation which published price index shall be used to establish the sales value for gold. The sales value for gold shall be the monthly average price published for gold for the month in which the taxable event occurs. When the taxable event is sale, the recoverable quantity of gold shall be reported as the provisional quantity determined by presale assay, and the reported quantity may be adjusted in a report filed after final assay, if necessary. When the taxable event is shipment, transmission or transportation out of New Mexico without sale, the recoverable quantity of gold shall be reported as the provisional quantity determined after preshipment assay. For purposes of the Severance Tax Act, gold shall not be considered saved unless the gold can economically be separated and saved from the dominant resource, which is the resource subject to sale by the severer. Any gold the value of which is computed under this subsection shall not also have its value computed by the use of any of the provisions of Subsection B of this section.

G. The gross value for silver shall be eighty percent of the sales value established from published price data, as further described in this subsection, of the quantity of silver recoverable from the concentrate or other product which is sold or is shipped, transmitted or transported out of New Mexico without sale, less fifty percent of the sales value as a deduction for the expenses of hoisting, loading, crushing, processing and beneficiation. For purposes of this subsection, the taxable event occurs when the severer sells silver in New Mexico or when the severer ships, transmits or transports silver out of New Mexico without first making sale of it. The secretary shall designate by regulation which published price index shall be used to establish the sales value for silver. The sales value for silver shall be the monthly average price published for silver for the month in which the taxable event occurs. When the taxable event is sale, the recoverable quantity of silver shall be reported as the provisional quantity determined by presale assay, and the reported quantity may be adjusted in a report filed after final assay, if necessary. When the taxable event is shipment, transmission or transportation out of New Mexico without sale, the recoverable quantity of silver shall be reported as the provisional quantity determined after preshipment assay. For purposes of the Severance Tax Act, silver shall not be considered saved unless the silver can economically be separated and saved from the dominant resource, which is the resource subject to sale by the severer. Any silver the value of which is computed under this subsection shall not also have its value computed by the use of any of the provisions of Subsection B of this section.

If royalties were to be paid, part H of that same statute provides for the subtraction of royalties paid:

“H. The taxable value of all severed natural resources except coal and uranium is the gross value of the severed resource determined under this section less rental or royalty payments belonging to the United States or the state.” ((2010 NMSA 1978/Statutory Chapters in New Mexico Statutes Annotated 1978/CHAPTER 7 Taxation /ARTICLE 26 Severance Tax /7-26-4. Determination of taxable value of natural resources. (1986))

Processors Tax: For the processors tax the taxable value is specified in NM State Statutes 7-25-3. In essence it is the value of the resource minus transportation costs and royalty payments.

“I. "taxable value" means the value after severing or processing, without deduction of any kind other than specified in this subsection, of any natural resource severed or processed in New Mexico. It is presumed, in the absence of preponderant evidence of another value, that the taxable value means the total amount of money or the reasonable value of other consideration received for the severed or processed natural resource. However, if the amount of money received does not represent the value of the severed or processed natural resource or if the severed or processed natural resource is not sold, the taxable value shall be the reasonable value of the severed or processed natural resource. All natural resources severed or processed in New Mexico shall be included in determining taxable value, regardless of the place of sale or the fact that delivery may be made to points outside of New Mexico. If any person shall ship, transmit or transport natural resources out of New Mexico without making sale of them or shall ship, transmit or transport natural resources out of New Mexico in an unfinished condition, the value of the natural resources in the condition in which they existed when shipped, transmitted or transported out of New Mexico and before they enter interstate commerce, without deduction of any kind other than specified in this subsection, shall be the basis for determining the taxable value. Amounts received from selling natural resources, other than metalliferous mineral ores, whether processed or unprocessed, to the United States or any agency or instrumentality thereof, the state of New Mexico or any political subdivision thereof, or to organizations that have demonstrated to the department that they have been granted exemption from the federal income tax by the United States commissioner of internal revenue as organizations described in Section 501 (c) (3) of the United States Internal Revenue Code of 1954, as amended or renumbered, which employ the natural resource in the conduct of functions described in Section 501 (c) (3) and not in the conduct of an unrelated trade or business as defined in Section 513 of the United States Internal Revenue Code of 1954, as amended or renumbered, may be deducted from taxable value. Any royalty or other similar interest, whether payable in cash or in kind, paid to the United States or any agency or instrumentality thereof, or the state of New Mexico or any political subdivision thereof, or any Indian tribe, Indian pueblo or Indian that is a ward of the United States may be deducted from taxable value. In computing taxable value, any owner of natural resources may deduct any service charge on which the service tax imposed by Section [7-25-6](#) NMSA 1978 is payable.” (2010 NMSA 1978/Statutory Chapters in New Mexico Statutes Annotated 1978/CHAPTER 7 Taxation /ARTICLE 25 Resources Excise Tax /7-25-3. Definitions. (2007))

Property Tax

The value of property for property tax purposes is specified in New Mexico State Statutes 7-39-4 and is known as the Copper Production Ad Valorem Tax Act. (2011 NMSA 1978 (unannotated)/NMSA 1978 (unannotated)/CHAPTER 7 Taxation /ARTICLE 39 Copper Production Ad Valorem Tax /7-39-4. Valuation of copper mineral property. (1990)

For non-operating mines Section C of NMSA 7-39-4 specifies that the property is subject to the Property Tax Code.

C. A copper mineral property from which no copper or other minerals were mined or processed during a period of at least twelve months immediately prior to the beginning of the tax year for which valuation is being determined is not subject to the Copper Production Ad Valorem Tax Act and is subject instead to the provisions of the Property Tax Code.

The types of property to be taxed are included in NMSA 7-36-23.

B. The following kinds of property held or used in connection with mineral property shall be valued under the methods of valuation required by the Property Tax Code [[Articles 35 to 38](#) of [Chapter 7](#) NMSA 1978]:

(1) improvements, equipment, materials, supplies and other personal property held or used in connection with all classes of mineral property; "improvements" as used in this section includes surface and subsurface structures, but does not include pits, shafts, drifts and other similar artificial changes in the physical condition of the surface or subsurface of the earth produced solely by the removal or rearrangement of earth or minerals for the purpose of exposing or removing ore from a mine; and

(2) the surface value for agricultural or other purposes of class one productive or nonproductive mineral property when the surface interest is held in the same ownership as the mineral interests. (2011 NMSA 1978 (unannotated)/NMSA 1978 (unannotated)/CHAPTER 7 Taxation /ARTICLE 36 Valuation of Property /7-36-23. Special method of valuation; mineral property and property used in connection with mineral property; exception for potash and uranium mineral property and property used in connection with potash and uranium mineral property. (1975)

For operating mines section A-1-a of NMSA 7-39-4 is applied.

A. The valuation for purposes of the Copper Production Ad Valorem Tax Act of copper mineral property of the following types shall be determined annually, except as provided otherwise in Subsection B, C or D of this section, as follows (2011 NMSA 1978 (unannotated)/NMSA 1978 (unannotated)/CHAPTER 7 Taxation /ARTICLE 39 Copper Production Ad Valorem Tax /7-39-4. Valuation of copper mineral property. (1990)):

(1) the value of any mine and all real property and personal property held or used for the mining of ore from the mine:

a) any part of which is mined for processing in a concentrator shall be thirty percent of the value of salable copper and other minerals contained in concentrate produced from the ore produced from the mine.

The tax rate to be applied to the value of property is specified in NM State Statutes 7-39-8.

An ad valorem tax is levied upon the owner of each copper mineral property that is not subject to valuation and taxation under the provisions of the Property Tax Code [Articles 35 to 38 of Chapter 7 NMSA 1978]. The amount of the tax shall be equal to the product of the taxable value determined for each copper mineral property owned multiplied by the rate certified to the department by the department of finance and administration for nonresidential property under the provisions of Sections 7-37-7 and 7-37-7.1 NMSA 1978 for the taxing jurisdictions in which the copper mineral property is located. (2011 NMSA 1978 (unannotated)/NMSA 1978 (unannotated)/CHAPTER 7 Taxation /ARTICLE 39 Copper Production Ad Valorem Tax /7-39-8. Ad valorem tax levied. (1990)).

Appendix D: Revenue Estimation Methodology: Effective Tax Rates

For each year and each tax, two quantities are needed to calculate an effective tax rate: (a) the amount of taxes collected and (b) Labor Income. Taxes collected in each category are reported by the U.S. Bureau of the Census reported in Table A1 while labor income consistent with the taxable income base must be estimated.

Using components of total personal income (TPI) as reported by the Bureau of Economic Analysis (BEA 2011) an adjusted personal income figure is computed that more closely represents the income which is taxable by the income tax and from which taxable sales are made. Adjusted personal income is defined to be equal to total personal income (TPI) minus most transfer payments and minus two components of dividends, interest and rent. Within transfer payments, retirement and disability insurance benefits and veterans benefits were not subtracted from TPI because these represent income that can be spent (and taxed) in the region. Most of the rest of transfer payments is comprised of medical payments. The two components of dividends, interest and rent that were subtracted off are the imputed rent (which consists of rent imputed on the value of owner-occupied housing) and imputed interest (which accrues but is typically not paid out to bondholders).

Revenue and income data used to compute New Mexico's effective tax rates are in Table XXX. The calculation of the effective tax rates is shown in Table XXX. The average effective tax rates from 2001 to 2009 are used throughout the report. For the purpose of estimating tax revenue, the important issue is the stability of the effective tax rates from year to year. Labor income based effective tax rates satisfy this criterion. The variability of the effective tax rates as measured by the standard deviation of each rate (Table XXX) is low.

New Mexico Revenue and Income

Calculation of New Mexico Effective Tax Rates						
NM Tax Revenue: 2001 to 2009						
Year	GRT	PIT	CIT	All other	Total	Adjusted Income
2001	\$2,083,196	\$830,006	\$190,673	\$898,371	\$4,002,246	\$38,314,863
2002	\$1,822,878	\$982,891	\$124,327	\$697,959	\$3,628,055	\$39,097,727
2003	\$1,873,420	\$923,113	\$101,546	\$709,077	\$3,607,156	\$40,651,774
2004	\$2,038,440	\$1,007,248	\$138,196	\$817,896	\$4,001,780	\$43,705,023
2005	\$2,170,521	\$1,086,015	\$242,462	\$979,323	\$4,478,321	\$46,875,653
2006	\$2,387,718	\$1,123,954	\$377,185	\$1,221,826	\$5,110,683	\$50,498,048
2007	\$2,646,901	\$1,177,918	\$459,880	\$1,242,518	\$5,527,217	\$53,618,936
2008	\$2,663,292	\$1,213,522	\$354,588	\$1,414,247	\$5,645,649	\$55,696,530
2009	\$2,493,029	\$932,442	\$203,584	\$1,222,634	\$4,851,689	\$54,413,239

GRT includes gross receipts and selective sales taxes.
 PIT refers to personal income taxes.
 CIT refers to corporate income taxes.
 IMPLAN Labor Income calculated from Bureau of Economic Analysis data and includes wage and salary disbursements, supplements to wages and salaries, and proprietors income.

Calculation of Effective Tax Rates

Year	GRT	PIT	CIT	All other	Total
2001	0.05437	0.02166	0.00498	0.02345	0.10446
2002	0.04662	0.02514	0.00318	0.01785	0.09279
2003	0.04608	0.02271	0.00250	0.01744	0.08873
2004	0.04664	0.02305	0.00316	0.01871	0.09156
2005	0.04630	0.02317	0.00517	0.02089	0.09554
2006	0.04728	0.02226	0.00747	0.02420	0.10121
2007	0.04937	0.02197	0.00858	0.02317	0.10308
2008	0.04782	0.02179	0.00637	0.02539	0.10136
2009	0.04582	0.01714	0.00374	0.02247	0.08916
Average	0.04781	0.02210	0.00502	0.02151	0.09643
Std. Dev.	0.00253	0.00202	0.00198	0.00275	0.00583



Appendix E: About Arrowhead Center

New Mexico State University's Arrowhead Center fosters sustainable economic development by utilizing a comprehensive approach to generate jobs, wealth, and enhanced quality of life in New Mexico. The Arrowhead Center focuses on the interrelated activities of technology commercialization, entrepreneurship, economic studies/policy analysis, workforce analyses, research park development, and business incubation that lead to economic development. One of the Arrowhead Center's key strategies to accomplish its economic development mission is providing value-added solutions to unmet needs in the region, and to work collaboratively with other economic and business development organizations.

The Arrowhead Center performs its role through two mechanisms, as an organizational unit of NMSU staffed primarily by NMSU personnel, including faculty, staff, and students, and as a non-profit corporation established in 2004, governed by a Board of Directors. The Corporation's Board is comprised of academic, business, and economic development leaders, providing the direction necessary to focus resources across New Mexico State University elements on the challenges of economic development.

The Arrowhead Center performs wide-ranging services that contribute to the creation and expansion of small businesses in New Mexico. These services and products include:

- Business assistance, including business plan development
- Entrepreneurship education and training
- Analysis of policy issues affecting New Mexico
- Incubating businesses in the Arrowhead Business and Research Park
- Identification of labor and training needs associated with commercial enterprises
- Spin-off of commercially viable business concepts and technologies
- Protection of, licensing, and commercialization of NMSU intellectual property
- Connection of key players in the business and economic development process

The Arrowhead Center has been in existence since 2004, with rapid growth in services provided to faculty, staff, students, entrepreneurs, small business, investors, and venture capitalists. Since its inception, the Center has completed more than 200 business research projects involving more than 300 undergraduate and graduate students, fostered the spin-off of a university genetics testing laboratory resulting in a new for-profit corporation, and completed several state-level economic studies. The Arrowhead Center has exceeded expectations and continues to provide quality services to New Mexico.

Board of Directors of Arrowhead Center (As of December 2012)

The Arrowhead Center's Board of Directors is comprised of leaders from New Mexico State University and at-large members from across New Mexico. Each Director was selected for their expertise, insight, and experience critical to the mission and strategic direction of the Arrowhead Center.

Tilahun Adera, Ph.D., Dean, College of Health and Social Services, New Mexico State University

Jon Barela, New Mexico Economic Development Secretary

Kevin Boberg, Ph.D., Director and Chief Executive Officer (CEO) of Arrowhead Center, New Mexico State University

Garrey Carruthers, Ph.D., NMSU Dean, College of Business & Vice President for Economic Development, New Mexico State University

Lowell Catlett, Dean, NMSU College of Agriculture, Consumer, and Environmental Sciences, New Mexico State University

Vimal Chaitanya, Ph.D., Vice President for Research, Graduate Studies, and International Programs, New Mexico State University

Barbara Couture, Ph.D., President, New Mexico State University

Christopher Dulany, NMSU Student Regent

Javier Gonzales, NMSU Regent

Ricardo Jacquez, Ph.D., Dean, College of Engineering, New Mexico State University

Jay Jordan, Ph.D., Dean and Director, Physical Sciences Laboratory, New Mexico State University

Bruce Kite, General Counsel (Ex-Officio), New Mexico State University

Davin Lopez, President and CEO, Mesilla Valley Economic Development Alliance

James Manatt, Jr., President, Providence Technologies

Jackie Kerby Moore, Executive Director, Sandia Science & Technology Park

Michael Morehead, Ph.D., Dean, NMSU College of Education

Michael Rivera, State Director, New Mexico Small Business Development Center (NMSBDC)

Van Romero, Vice President for Research and Economic Development New Mexico Institute of Mining and Technology

Christa Daryl Lowder Slaton, Ph.D., Dean, College of Arts and Sciences, New Mexico State University

Angela Throneberry, CPA, NMSU Interim Senior Vice President for Administration and Finance

Wendy K. Wilkins, Ph.D., Provost and Executive Vice President, New Mexico State University

Ben Woods, Chief of Staff, New Mexico State University