

# THE MINERAL INDUSTRY OF NEW MEXICO

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the New Mexico Bureau of Mines and Mineral Resources for collecting information on all nonfuel minerals.

In 1998, the preliminary estimated value<sup>1</sup> of nonfuel mineral production for New Mexico was \$860 million, according to the U.S. Geological Survey (USGS). This was a 17% decrease from that of 1997<sup>2</sup> following a 4.8% increase from 1996 to 1997. The State decreased to 18th from 14th in rank among the 50 States in total nonfuel mineral production value, of which New Mexico accounted for more than 2% of the U.S. total.

The top nonfuel minerals mined in New Mexico were, by value, copper and potash, followed by construction sand and gravel and portland cement. Together, these four accounted for about 88% of the State's total nonfuel mineral production value. In 1998, decreases in the values of copper (down 29%) and potash (down 7%) accounted for the large majority of the State's drop in value. Smaller—yet significant—decreases also occurred in dimension stone and gold. Most other mineral commodities increased in value, led by crushed stone, up \$12.5 million, and construction sand and gravel, up \$8.4 million. In 1997, most of the increase in value resulted from rises in the values of molybdenum and potash. The largest decreases in value (in descending order of change) occurred in crushed stone, copper, and construction sand and gravel (table 1).

Based on USGS estimates of the quantities of minerals produced in the 50 States during 1998, New Mexico continued to lead<sup>2</sup> the Nation in potash, perlite, and zeolites and remained second in pumice, third in copper and crude mica, and sixth in molybdenum. Additionally, the State rose from 11th to 10th in the production of crude gypsum.

The following narrative information was provided by the New Mexico Bureau of Mines and Mineral Resources (BMMR).<sup>3</sup> Production data in the following text are those

<sup>1</sup>The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending on the minerals or mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 1998 USGS mineral production data published in this chapter are preliminary estimates as of February 1999 and are expected to change. For some mineral commodities (for example, construction sand and gravel, crushed stone, and portland cement), estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. A telephone listing for the specialists may be retrieved over the Internet at <http://minerals.usgs.gov/minerals/contacts/comdir.html>; by using MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset (request Document #1000 for a telephone listing of all mineral commodity specialists); or by calling USGS information at (703) 648-4000 for the specialist's name and number. All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at <http://minerals.usgs.gov/minerals>; facsimile copies may be obtained from MINES FaxBack.

<sup>2</sup>Values, percentage calculations, and rankings for 1997 may vary from the *Minerals Yearbook, Area Reports: Domestic 1997, Volume II*, owing to the revision of preliminary 1997 to final 1997 data. Data for 1998 are preliminary and expected to change, while related rankings may also be subject to change.

<sup>3</sup>Virginia McLemore, Senior Economic Geologist, authored the information submitted by the New Mexico Bureau of Mines and Mineral Resources.

reported by the BMMR, based on canvass survey data collected by New Mexico's Department of Energy, Minerals and Natural Resources and related information collected by the BMMR. They may differ from some production figures reported to the USGS. Metals prices continued to drop in 1998 resulting in layoffs and mine closures and cutbacks. Phelps Dodge Corp. continued to mine copper at Santa Rita (Chino) and Tyrone. Copper prices fell in response to increased inventories worldwide. The Comex spot price averaged \$1.35 per pound in 1995, \$1.06 per pound in 1996, \$1.04 per pound in 1997, and \$0.75 per pound in 1998.

Phelps Dodge's 66.7%-owned Chino Mine in Santa Rita produced 77,600 metric tons (t) of copper concentrate and precipitate and 65,700 t of copper by solvent extraction-electrowinning (SX-EW) (Phelps Dodge Corp., 1999). Estimated milling reserves in 1998 are 318 million metric tons (Mt) of 0.62% copper and estimated leaching reserves are 438 Mt of 0.3% copper. On October 21, 1998, Phelps Dodge Corp. announced that production will be curtailed at Chino as a result of the copper price decrease. At Phelps Dodge's Tyrone Mine, copper production by SX-EW in 1998 amounted to 74,900 t of copper. Leaching reserves (recoverable copper) were estimated as 423 Mt of ore grading 0.32% copper (Phelps Dodge Corp., 1999).

On Feb. 3, 1998, Phelps Dodge Corp. acquired Cobre Mining Co., Inc. for approximately \$115 million. The acquisition included the open pit mine, two underground mines, two mills, and surrounding 4,500 hectares of land. Estimated milling reserves in 1998 were 121 Mt of 0.73% copper and estimated leaching reserves were 89 Mt of 0.35% copper (Phelps Dodge Corp., 1999). Most of the copper reserves at the Cobre Mine are in the Syrena and upper part of the Lake Valley limestones north of the Barringer fault. Chalcopyrite is the chief ore mineral, with minor magnetite and iron-rich sphalerite. Copper production from the Cobre Mine amounted to 31,000 t in 1998. The mine was closed at the end of 1998 because of the drop in copper prices.

Environmental Impact Statements (EIS) are being prepared for expansions at Santa Rita, Chino, and Cobre mines. In addition, Phelps Dodge Corp., in voluntary cooperation with the New Mexico Environment Department, is beginning reclamation at six sites in the Silver City area affected by historic mining: Whitewater Creek, Hanover Creek, Lampbright area, Hurley smelter, town of Hurley, and tailings area south of the smelter. The first stage is to develop a background report defining the problems. Successive stages will involve remedial investigations, a feasibility study, and remedial action.

The opening of the Copper Flat Mine at Hillsboro has been delayed until a final decision by the Bureau of Land Management (BLM) on the draft EIS (released February 1996). BMMR held public hearings in late 1996, and a mining permit may be issued in 2000.

In July, Summo Minerals Corp. of Vancouver dropped the Champion Mine claims at the Copper Hill deposit in the Picuris district in Taos County. The deposit, near Dixon, has reserves estimated at 42.2 Mt of ore grading 0.42% copper. BLM and the Picuris Pueblo are opposed to the mine because it sits between two canyons that drain into the Rio Grande and Rio Embudo—both may receive Wild and Scenic River designations.

Molycorp, Inc.'s (a subsidiary of Unocal Corp.) estimated production for 1998 was 5,400 t of molybdenite. Ore grade was estimated as 0.3% to 0.5% Mo. There are now three shifts, totaling 300 people, working at the mine and mill. The company continued with a reclamation and revegetation program to cover overburden dumps at the inactive open pit mine site. A proposed expansion plan was announced in September that would mine an estimated 64 Mt of ore reserves. However, as a result of drop in molybdenum prices at the end of 1998, Molycorp announced that it will curtail production at the Questa Mine and lay off 154 employees.

St. Cloud Mining Co. (a subsidiary of The Goldfield Corp.) operated a zeolite open pit mine in Sierra County since 1990. In 1998, St. Cloud produced 12,787 t of natural zeolite, compared to 13,620 t and 13,114 t in 1997 and 1996, respectively. St. Cloud Mining Co. has made several modifications to its zeolite operation, including the addition of cation exchange capacity for added value products and additional classification capabilities to expand markets for its products.

St. Cloud owns claims in the Lordsburg mining district in Hidalgo County where 15,011 t of construction aggregate material was produced in 1998, compared to 22,274 t and 12,764 t in 1997 and 1996, respectively (The Goldfield Corp., 1999, Form 10K to Securities and Exchange Commission, accessed November 2, 1999, at URL [www.sec.gov/Archives/edgar/data/42316/0000042316-99-000010.txt](http://www.sec.gov/Archives/edgar/data/42316/0000042316-99-000010.txt)).

El Cajete pumice mine expansion in the Jemez Mountains (Copar Pumice Co.) was delayed until preparation of an EIS

(draft released early 1997). The mine opened in 1997 and is expected to operate for 10 years. Reserves are estimated at 90,000 t of pumice that will be used in making stonewashed jeans. Other pumice mines are active in the region.

The Carlsbad potash district is the largest potash-producing area in the United States. Mississippi Potash, Inc. (a subsidiary of Mississippi Chemical Corp.) and IMC Kalium Potash Mines (a subsidiary of IMC Global Inc.) operate mines in the district. Mining is by underground methods; solution mining is locally used as well. Sodium salt is also produced locally. Potash is used mainly in fertilizers. In 1998, IMC Kalium Potash Mines began construction of a new processing facility.

The MICA Mine in Taos County, owned by KMG Minerals Division of Franklin Industries, Inc., announced expansion plans in early 1999. The current mine is the fourth largest scrap mica mine in the United States and covers approximately 4.5 hectares. The expansion calls for an increase to 36 hectares within 20 years. The nearby Picuris Pueblo opposes any expansion of the mine.

Increase in the price of uranium led to the continued operation by Quivira Mining Co. (subsidiary of Rio Algom Ltd., successor to Kerr McGee Corp.) of minewater recovery of uranium from waters recovered from inactive underground operations at Ambrosia Lake, Grants, NM. Minewater recovery ceased in 1992 because of decline in the price of uranium but resumed in 1994. Approximately 78 t of  $U_3O_8$  were produced from minewater recovery. Hydro Resources, Inc. continues with plans to mine uranium by in-situ leaching at Churchrock and NZU Inc. plans to mine at Crownpoint, also by in situ leaching.

### Reference Cited

Phelps Dodge Corp., 1999, Phelps Dodge annual report 1998: Phelps Dodge Corp., 73 p.

TABLE 1  
NONFUEL RAW MINERAL PRODUCTION IN NEW MEXICO 1/ 2/

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1996		1997		1998 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays:						
Common	32	165	32	168	33	171
Fire	W	W	1	17	1	17
Copper 3/	256	614,000	259	612,000	248	437,000
Gemstones	NA	54	NA	W	NA	11
Potash	2,430	225,000	W	W	W	W
Pumice and pumicite metric tons	102,000	527	W	W	W	W
Sand and gravel: Construction	9,880	48,500	9,390	46,600	10,700	55,000
Stone: Crushed 4/	3,480	18,800	2,920	15,700	4,700	28,200
Zeolites metric tons	W	NA	W	NA	NA	NA
Combined values of cement [masonry (1997-98) portland], gold, gypsum (crude) iron ore (usable), mica (crude), molybdenum, perlite (crude), salt, silver, stone [crushed quartzite and traprock (1996), crushed traprock (1997-98), dimension granite and marble (1996-97), dimension miscellaneous (1998)], and values indicated symbol W	XX	85,100	XX	363,000	XX	340,000
Total	XX	992,000	XX	1,040,000	XX	860,000

p/ Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data. XX Not applicable.

1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

2/ Data are rounded to three significant digits; may not add to totals shown.

3/ Recoverable content of ores, etc.

4/ Excludes certain stones; value included with "Combined values" data.

TABLE 2  
NEW MEXICO: CRUSHED STONE SOLD OR USED, BY KIND 1/

Kind	1996				1997			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	23	1,350	\$6,090	\$4.50	22	1,230	\$5,670	\$4.63
Granite	6	1,490	9,240	6.20	6	870	6,160	7.08
Volcanic cinder and scoria	5	283	2,170	7.66	5	276	2,420	8.78
Traprock	1	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)	(2/)
Quartzite	1	(2/)	(2/)	(2/)	--	--	--	--
Miscellaneous stone	2	348	1,350	3.87	4	554	1,410	2.54
Total	XX	3,480	18,800	5.42	XX	2,920	15,700	5.36

XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Excluded from State total to avoid disclosing company proprietary data.

TABLE 3  
 NEW MEXICO: CRUSHED STONE SOLD OR USED BY PRODUCERS  
 IN 1997, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
<b>Coarse aggregate (+1 1/2 inch):</b>			
Riprap and jetty stone	49	\$296	\$6.04
Other coarse aggregate 3/	8	66	8.25
<b>Coarse aggregate, graded:</b>			
Concrete aggregate, coarse	172	1,050	6.09
Bituminous aggregate, coarse	28	193	6.89
Bituminous surface-treatment aggregate	93	543	5.84
Other graded coarse aggregate 4/	491	3,990	8.13
<b>Fine aggregate (-3/8 inch):</b>			
Screening, undesignated	73	249	3.41
Other fine aggregate	34	131	3.85
<b>Coarse and fine aggregates:</b>			
Graded road base or subbase	444	1,870	4.21
Crusher run or fill or waste	21	55	2.62
Other coarse and fine aggregate	14	84	6.00
Other construction materials 5/	85	443	5.21
Chemical and metallurgical: Cement manufacture	W	W	4.90
Special: Roofing granules	W	W	20.83
Other miscellaneous uses not listed	W	W	27.60
<b>Unspecified: 6/</b>			
Actual	263	299	1.14
Estimated	457	1,850	4.06
Total	2,920	15,700	5.36

W Withheld to avoid disclosing company proprietary data; included in "Total."

1/ Includes granite, limestone, miscellaneous stone, and volcanic cinder and scoria; excludes quartzite and traprock from State total to avoid disclosing company proprietary data.

2/ Data are rounded to three significant digits, except unit value; may not add to totals shown.

3/ Includes filter stone.

4/ Includes railroad ballast.

5/ Includes terrazzo and exposed aggregate.

6/ Includes reported and estimated production without a breakdown by end use.

TABLE 4  
NEW MEXICO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1997,  
BY USE AND DISTRICT 1/ 2/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>Construction aggregates:</b>						
Coarse aggregate (+1 1/2 inch) 3/	W	W	W	W	--	--
Coarse aggregate, graded 4/	W	W	W	W	--	--
Fine aggregate (-3/8 inch) 5/	W	W	W	W	--	--
Coarse and fine aggregate 6/	324	1,630	W	W	--	--
Other construction materials	W	W	W	W	--	--
Chemical and metallurgical 7/	W	W	--	--	--	--
Other miscellaneous use	47	1,300	--	--	--	--
<b>Unspecified 8/</b>						
Actual	--	--	--	--	263	(9/)
Estimated	330	1,290	127	(9/)	--	--
<b>Total</b>	<b>2,120</b>	<b>13,300</b>	<b>543</b>	<b>2,090</b>	<b>263</b>	<b>(9/)</b>

W Withheld to avoid disclosing company proprietary data; included in "Total."

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes limestone, granite, volcanic cinder and scoria, and miscellaneous stone; excludes traprock from State total to avoid disclosing company proprietary data.

3/ Includes filter stone, riprap and jetty stone, and other coarse aggregate.

4/ Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregate.

5/ Includes stone sand (concrete) and screening (undesignated).

6/ Includes graded road base or subbase, terrazzo and exposed aggregate, crusher run (select material or fill), roofing granules, and other coarse and fine aggregates.

7/ Includes cement manufacture.

8/ Includes reported and estimated production without a breakdown by end use.

9/ Less than 1/2 unit.

TABLE 5  
NEW MEXICO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1997,  
BY MAJOR USE CATEGORY 1/

Use	Quantity	Value (thousands)	Value per ton
	(thousand metric tons)		
Concrete aggregate	1,870	\$10,600	\$5.66
Concrete products 2/	256	1,480	5.76
Asphaltic concrete aggregates and other bituminous mixtures	1,210	7,070	5.84
Road base and coverings	1,870	8,640	4.61
Fill	481	1,860	3.87
Other miscellaneous uses	81	406	5.01
<b>Unspecified 3/</b>			
Actual	1,540	6,390	4.15
Estimated	2,080	10,200	4.92
<b>Total or average</b>	<b>9,390</b>	<b>46,600</b>	<b>4.97</b>

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes plaster and gunite sands.

3/ Includes reported and estimated production without a breakdown by end use.

TABLE 6  
 NEW MEXICO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1997,  
 BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate	1,390	7,450	475	3,130	--	--
Concrete products 2/	228	1,340	28	135	--	--
Asphaltic concrete aggregates and roadbase materials	2,140	10,700	948	5,040	--	--
Other miscellaneous uses 3/	312	1,300	250	964	--	--
Unspecified 4/	2,780	14,200	307	1,560	534	884
Total	6,850	34,900	2,010	10,800	534	884

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes plaster and gunite sands.

3/ Includes fill.

4/ Includes reported and estimated production without a breakdown by end use.