

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 1997, for the second consecutive year, New Mexico ranked 12th among the 50 States in total nonfuel mineral production value,¹ according to the U.S. Geological Survey (USGS). The estimated value for 1997 was \$994 million, virtually the same as that of 1996. This followed a 12.2% decrease from 1995 to 1996 (based on final 1996 data). The State accounted for about 2.5% of the U.S. total nonfuel mineral production value.

Copper and potash, by value, were the top nonfuel minerals mined in New Mexico. Based on final 1996 data, the 2 commodities together accounted for 85% of the State's total nonfuel mineral production value and were 17 times the value of New Mexico's next highest mineral commodity, construction sand and gravel. In 1997, production increases, especially in the values of potash, crude gypsum, portland cement, and crude perlite, compensated for the decreases in copper, crushed stone, construction sand and gravel, and gold. Changes in the other mineral commodities were small relative to these. In 1996, most of the decrease in value resulted from the drop in copper and a relatively smaller decrease in potash (*table 1*). Despite a little more than 2% rise in production, the value of copper declined by about 20% or \$150 million, owing to a fall in the price of copper.

Based on USGS estimates of the quantities of minerals produced in the 50 States during 1997, New Mexico continued to lead the Nation in potash, perlite, and zeolites; remained second in crude mica, third in copper, and sixth in molybdenum; and rose to second from third in pumice. In addition, significant quantities of gypsum were mined in the State.

The following narrative information was provided by the New Mexico Bureau of Mines and Mineral Resources² (BMMR). Production data in the following text are those 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. Phelps Dodge Corp. continues to mine copper at Santa Rita and Tyrone,

despite the drop in copper prices in 1997. The decline in the value of copper production was primarily the result of a decline in copper prices. The Comex spot price averaged \$1.35 per pound in 1995, \$1.06 per pound in 1996, \$1.04 per pound in 1997.

Phelps Dodge's Chino Mine in Santa Rita produced 90,000 metric tons of copper in concentrate and precipitates and 64,000 tons of copper by solvent extraction/electrowinning (SX/EW) (Phelps Dodge Corp. Annual Report, 1998). Milling reserves were estimated in 1997 at 335 million tons of 0.62% copper and estimated leaching reserves were 472 million tons of 0.3% copper. The Chino Mines Co. employed 1,260 people in 1997 at its mine and smelter and set an annual anode production record of 154,000 tons in 1997. The SX/EW expansion project was also completed in 1997. At Phelps Dodge's Tyrone Mine, leaching reserves (recoverable copper) were estimated as 413 million tons of ore grading 0.34% copper in 1997 (Phelps Dodge Corp. Annual Report, 1998). Copper production by SX/EW in 1997 amounted to 68,000 tons of copper. The Tyrone Mine employs approximately 550 workers.

Mining continued at the Continental Mine in the Fierro-Hanover district, where Cobre Mining Co., Inc. operated through the end of 1997. At yearend, Phelps Dodge Corp. was negotiating the acquisition of Cobre Mining Co., Inc. The acquisition would likely include Cobre's open pit mine, 2 underground mines, 2 mills, and the surrounding 4,500 hectares of land.

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

Opening of the Copper Flat Mine at Hillsboro has been delayed until there is 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 1998. The Copper Flat deposit, discovered in 1975, contains copper, gold, molybdenum, and silver disseminated in a quartz-monzonite stock and in quartz veins (Dunn, 1982, 1984). Current reserves of the deposit were estimated as 221,000 tons copper, 7.6 tons gold, 100 tons silver, and 7,120 tons molybdenum (Dillard, 1995).

Summo Minerals Corp. of Vancouver applied for mining permits to mine the Copper Hill deposit in the Picuris district in Taos County. The deposit is near Dixon and would be mined by

¹The 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 1997 USGS mineral production data published in this chapter are estimates as of January 1998. For some 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. Call MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset, and request Document # 1000 for a telephone listing of all mineral commodity specialists, or call USGS information at (703) 648-4000 for the specialist's name and number. This telephone listing may also be retrieved over the Internet at <http://minerals.er.usgs.gov/minerals/contacts/comdir.html>. All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved by way of MINES FaxBack or over the Internet at <http://minerals.er.usgs.gov/minerals/>.

²Virginia McLemore, Geologist, authored the information submitted by the New Mexico Bureau of Mines and Mineral Resources.

open pit methods. Preliminary drilling indicated that the deposit could yield 5,000 to 14,000 tons of copper over a 10-year mine life. Exploration is still underway. BLM and the Picuris Pueblo opposed the mine because it is located between two canyons that drain into the Rio Grande and Rio Embudo Rivers—both may receive Wild and Scenic River designations.

Unocal Corp.'s estimated production for 1997 is 6,800 tons of molybdenite. Molybdenum is used to manufacture various metal products, especially steel, and molybdenum disulfide, used as a lubricant. The company also initiated a reclamation and revegetation program to cover overburden dumps at the inactive open pit mine site.

The Lordsburg Mining Co., a subsidiary of The Goldfield Corp., received the BMMR's Excellence in Mine Reclamation Award in 1997 for voluntary cleanup of the Weststar Corp. leaching facility near Lordsburg. In 1989, Weststar, a gold leaching company, went bankrupt and abandoned a 27,000-ton cyanide heap-leach facility. The Lordsburg Mining Co. not only reclaimed the site but was also able to sell the material for aggregate and silica flux in 1995 and 1996. In 1996, the company sold 16,000 tons of barren, siliceous flux ore to copper smelters, but in 1997 there was no silica flux ore sold. In 1997, the Lordsburg Mining Co. sold 22,000 tons of construction aggregate.

The U.S. Environmental Protection Agency began cleanup of lead and arsenic contamination at the inactive Stephenson-Bennett Mine in the Organ Mountains. High levels of lead and arsenic were found in soils in nearby Butterfield Park and one boy reportedly had high levels of lead in his blood (El Paso Times, November 18, 1997). The Stephenson-Bennett Mine is a carbonate-hosted lead-silver and zinc-lead deposit (polymetallic replacement) mined in the 1880's and early 1900's.

St. Cloud Mining Co., a subsidiary of The Goldfield Corp., has operated a zeolite open pit mine in Sierra County since 1990. The mining properties consist of approximately 600 hectares and contain several hundred million tons of reserves (The Goldfield Corp. Annual Report, 1998). Zeolites are altered volcanic ash and clinoptilolite is the predominant mineral. Clinoptilolite is mined, crushed, dried, and sized without beneficiation and shipped in packaged form to meet customer specifications. Markets include cat litter, industrial fillers and absorbents, filtration media, environmental products, animal feed supplements, and soil conditioners. In 1997, St. Cloud sold 13,600 tons of natural zeolite compared with 13,100 tons in 1996 and 18,800 tons in 1995.

Full operation of the El Cajete pumice mine in the Jemez Mountains (Copar Pumice Co.) was delayed until preparation of an EIS (draft released early 1997). The mine opened in 1997 and will operate for 10 years. Reserves are estimated at 90,000 tons of pumice that will be used in making stone-washed jeans. Other mines are active in the region.

Eddy Potash, Inc. closed its potash mines in December as a result of depletion of high-grade ore. Mississippi Potash Co., a subsidiary of Mississippi Chemical Corp., bought Eddy Potash, in August 1996. Mississippi Chemical Corp., IMC Global Inc., and Western Ag-Minerals Co. operate mines in the Eddy County potash district. Langbeinite and sylvite are the primary potash minerals found in Permian evaporates of the Permian Basin. Mining is by underground methods; solution mining is locally used as well. Sodium salt is also produced locally.

At the end of the year, IMC Global was in the process of purchasing Harris Chemical Group, including Great Salt Lake Minerals. In September, IMC Global completed the purchase of Western Ag-Mineral from Rayrock Yellowknife Resources.

A new turquoise mine opened in May 1997—the Lost Mine of Enchantment, near Ruidoso in Lincoln County. The turquoise is green, mottled with brownish streaks, and is being sold for \$3 to \$15 a carat.

San Pedro Mining Corp. applied for and received a mining permit for industrial grade garnet in November 1996, from the New Mexico Mining and Minerals Division (NMMMD) to reprocess the mine dumps at the San Pedro Mine in Santa Fe County. The State Mining and Minerals Commission upheld the mining permit issued by NMMMD to allow the San Pedro Mine to reopen. The company still must obtain a mining permit from the Santa Fe County Mining Commission. The county claims that mining is not an appropriate use for the area.

Addwest Minerals, Inc.'s Wind Mountain nepheline syenite project in southern Otero County is on hold. The nepheline syenite was to be used as a constituent in amber-colored beverage containers, ceramics, and flatglass.

Improvement in the price of uranium led to the continued operation by Quivira Mining Co., a subsidiary of Rio Algom Ltd. (successor to Kerr McGee Corp.), of mine water recovery of uranium from inactive underground operations at Ambrosia Lake, Grants, NM. Mine water recovery ceased in 1992 because of a decline in the price of uranium, but resumed in 1994. Approximately 78 tons of U₃O₈ were produced from mine water recovery.

References Cited

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- The Goldfield Corp., 1998, Goldfield annual report 1997: The Goldfield Corp., 20 p.
- Phelps Dodge Corp., 1998, Phelps Dodge annual report 1997: Phelps Dodge Corp., 75 p.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1995		1996		1997 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	127	274	32	165	41	129
Copper 3/	250	764,000	256	614,000	W	W
Gemstones	NA	22	NA	54	NA	54
Potash	2,330	209,000	2,430	225,000	2,450	240,000
Pumice and pumicite metric tons	W	W	102,000	527	W	W
Sand and gravel, construction	10,400	50,700	9,880	48,500	9,070	45,600
Silver 3/ metric tons	20	3,300	W	W	W	W
Stone, crushed	3,660	18,800	3,480 4/	18,800 4/	2,700 4/	15,000 4/
Combined value of cement (portland), clays (fire), gold, gypsum (crude), iron ore (usable), mica (crude), molybdenum, perlite (crude), salt, stone [crushed quartzite and traprock (1996-97), dimension granite and marble], zeolites, and values indicated symbol W	XX	83,900	XX	85,100	XX	693,000
Total	XX	1,130,000	XX	992,000	XX	994,000

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

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

Kind	1995				1996			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone 2/	20	1,640	\$6,180	\$3.77	23	1,350	\$6,090	\$4.50
Granite	4	1,470	9,110	6.21	6	1,490	9,240	6.20
Volcanic cinder and scoria	5	197	1,770	8.98	5	283	2,170	7.66
Traprock	1	W	213	W	(3/)	(3/)	(3/)	(3/)
Quartzite	1	W	W	9.96 r/	(3/)	(3/)	(3/)	(3/)
Miscellaneous stone	2	W	W	4.53	3	348	1,350	3.87
Total	XX	3,660	18,800	5.12	XX	3,480	18,800	5.42

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

2/ Includes "limestone-dolomite" reported with no distinction between the two.

3/ Excludes quartzite and traprock from State total to avoid disclosing company proprietary data.

TABLE 3
NEW MEXICO: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 1996, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch), riprap and jetty stone	21	\$179	\$8.52
Coarse aggregate, graded:			
Concrete aggregate, coarse	275	1,530	5.57
Bituminous surface-treatment aggregate	57	284	4.98
Other graded coarse aggregate 3/	759	6,090	8.03
Fine aggregate (-3/8 inch):			
Stone sand, concrete	W	W	4.22
Screening, undesignated	278	611	2.20
Coarse and fine aggregates:			
Graded road base or subbase	178	673	3.78
Unpaved road surfacing	W	W	4.22
Terrazzo and exposed aggregate	112	1,590	14.16
Crusher run or fill or waste	30	145	4.83
Other construction materials 4/	36	208	5.78
Agricultural limestone	(5/)	(5/)	3.89
Chemical and metallurgical, cement manufacture	(5/)	(5/)	4.77
Unspecified: 6/			
Actual	285	1,100	3.86
Estimated	813	3,420	4.20
Total	3,480	18,800	5.42

W Withheld to avoid disclosing company proprietary data; included with "Other construction materials."

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 bituminous aggregate (coarse) and railroad ballast.

4/ Includes roofing granules.

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

6/ Includes production reported without a breakdown by end use and with estimates for nonrespondents.

TABLE 4
NEW MEXICO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1996,
BY USE AND DISTRICT 1/ 2/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Construction aggregates:				
Coarse aggregate (+1 1/2 inch) 3/	19	159	2	20
Coarse aggregate, graded 4/	1,050	7,790	40	117
Fine aggregate (-3/8 inch) 5/	W	W	W	W
Coarse and fine aggregate 6/	W	W	W	W
Other construction materials 7/	518	2,750	115	477
Agricultural 8/	(9/)	(9/)	--	--
Chemical and metallurgical 10/	(9/)	(9/)	--	--
Unspecified 11/				
Actual	234	1,040	51	56
Estimated	434	1,660	379	1,750
Total	2,890	16,400	588	2,420

W Withheld to avoid disclosing company proprietary data; included with "Other construction materials."

1/ Excludes quartzite and traprock from State total to avoid disclosing company proprietary data.

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

3/ Includes riprap and jetty stone.

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, unpaved road surfacing, and crusher run (select material or fill).

7/ Includes roofing granules.

8/ Includes agricultural limestone.

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

10/ Includes cement manufacture.

11/ Includes production reported without a breakdown by end use and with estimates for nonrespondents.

TABLE 5
NEW MEXICO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1996,
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate and concrete products 2/	1,580	\$9,450	\$5.97
Asphaltic concrete aggregates and other bituminous mixtures	500	3,200	6.40
Road base and coverings	885	4,150	4.69
Fill	320	627	1.96
Other miscellaneous uses 3/	385	663	1.72
Unspecified: 4/			
Actual	3,820	19,200	5.01
Estimated	2,380	11,200	4.73
Total or average	9,880	48,500	4.91

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

2/ Includes plaster and gunite sands.

3/ Includes railroad ballast, and snow and ice control.

4/ Includes production reported without a breakdown by end use and with estimates for nonrespondents.

TABLE 6
NEW MEXICO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1996,
BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	886	5,130	697	4,330
Asphaltic concrete aggregates and roadbase materials	982	5,950	402	1,400
Fill	123	218	198	409
Other miscellaneous uses 3/	7	38	378	625
Unspecified: 4/				
Actual	3,710	18,600	117	611
Estimated	1,800	8,650	579	2,600
Total	7,500	38,500	2,370	9,970

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

2/ Includes plaster and gunite sands.

3/ Includes railroad ballast, and snow and ice control.

4/ Includes production reported without a breakdown by end use and with estimates for nonrespondents.