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 2000, the estimated value[1] of nonfuel mineral production for New Mexico was $812 million, based upon preliminary U.S. Geological Survey (USGS) data. This was a 13.6% increase from that of 1999[2] and followed a 16.2% decrease from 1998 to 1999. The State rose to 18th from 21st in rank among the 50 States in total nonfuel mineral production value and accounted for 2% of the U.S. total.

The top nonfuel minerals in New Mexico were, by value, copper and potash and were followed by construction sand and gravel and portland cement. These four accounted for nearly 91% of the State's total nonfuel mineral production value. In 2000, the combined increase in the production values of copper, potash, and construction sand and gravel (descending magnitude of change) was $106 million, accounting for a large majority of the State's rise in value. Although small relative to these, significant increases also occurred in the values of lime and iron ore. The only significant decreases in value included a $6 million drop in molybdenum concentrates along with a much smaller drop in dimension stone. In 1999, decreases in the values of copper (down $108 million), potash (down $27 million), and molybdenum (down about $15 million) accounted for most of the State's drop in value. Gold, salt, and silver had smaller decreases in value, in a range from about $4.5 million down to about $1.5 million. The largest increase in value was that of portland cement, up about $9 million; smaller increases occurred in mica, perlite, crushed stone, and industrial sand and gravel (table 1).

Based upon USGS estimates of the quantities of minerals produced in the 50 States during 2000, New Mexico was first in the Nation in potash, perlite, and zeolites; second in mica; third in copper and pumice and pumicite; sixth in molybdenum; and seventh in gypsum (production listings by descending order of value).

[1]The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon 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 2000 USGS mineral production data published in this chapter are preliminary estimates as of July 2001 and are expected to change. For some mineral commodities, such as 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 of the specialists may be retrieved over the Internet at URL 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 URL http://minerals.usgs.gov/minerals; facsimile copies may be obtained from MINES FaxBack.

[2]Values, percentage calculations, and rankings for 1999 may vary from the Minerals Yearbook, Area Reports: Domestic 1999, Volume II, owing to the revision of preliminary 1999 to final 1999 data. Data for 2000 are preliminary and are expected to change; related rankings may also change.

The following narrative information was provided by the New Mexico Bureau of Mines and Mineral Resources.[3] Copper prices rose in 2000 after the drop in prices in 1998 and 1999. Commodity Exchange (COMEX) spot prices averaged $0.75 per pound in 1998, $0.72 per pound in 1999, and $0.84 per pound in 2000.

The largest porphyry copper deposit in New Mexico was at the Chino Mine at Santa Rita. In 2000, Phelps Dodge Corp. produced 79,000 metric tons (t) of copper in concentrates and precipitates and 44,000 t of copper by solvent extraction-electrowinning (SX-EW) (Phelps Dodge Corp., 2001, p. 7). The company developed a first-of-its-kind control system to guide the processing of the wide variety of ore found in the Chino deposit. The system saves costs by analyzing the ore as it comes into the concentrator and continually adjusts ore processing conditions.

The Tyrone porphyry copper deposit in the Burro Mountains also is the source of 1 of the top 10 mines in the United States in terms of mine production. Copper production by SX-EW in 2000 amounted to 71,900 t of copper (Phelps Dodge Corp., 2001, p. 7).

Molybdenum was produced from the Questa Mine in Taos County and as a byproduct of copper smelting in Grant County. Molycorp Inc., a subsidiary of Unocal Corp., processed 375,000 t of crude ore in 2000 that resulted in 585 t MoS_2 (351 t Mo) of concentrate recovered. Approximately 150 people worked at the mine in 2000.

Molycorp also continued with a reclamation and revegetation program to cover overburden dumps at the inactive open pit site. In 2000, Molycorp posted a $129 million cleanup bond in response to the New Mexico Environmental Department's concerns about reclamation of the mine site (Paydirt, 2000). In May 2000, the U.S. Environmental Protection Agency proposed the Questa Mine for the National Priorities List. As a result, the USGS and the State of New Mexico are conducting additional hydrologic studies.

Royal Minerals, Inc. shipped 5 t of concentrate containing copper, gold, lead, silver, and zinc to a company in Utah from the Center Mine in the Steeple Rock district, Grant County in 2000.

The Carlsbad potash district is the largest potash-producing area in the United States. IMC Potash (a subsidiary of IMC Global Inc.) and Mississippi Potash Inc. (a subsidiary of Mississippi Chemical Corp.) operated mines in the district. Production capacity for IMC Potash was over 1.5 million metric tons per year (Mt/yr) of finished product (IMC Global Inc., 2001, p. 6).

Mississippi Potash Inc. owns two facilities in Carlsbad, the east and west mines. The combined production capacity is estimated at 1 Mt/yr; 900,000 t were sold in 2000. Two types of

[3]Virginia T. McLemore, Senior Economic Geologist, authored the information submitted by the New Mexico Bureau of Mines and Mineral Resources.

ore were processed. Flotation was used to produce red potash and hot leach crystallization was used to produce the higher purity white potash.

St. Cloud Mining Co. (a subsidiary of Goldfield Corp.) operated the largest zeolite mine in the United States at the Stone House Mine in Sierra County. Clinoptilolite, the predominant mineral, is mined, crushed, dried, and sized without beneficiation and shipped packaged to meet customer's specifications. St. Cloud produced 14,900 t of natural zeolite in 2000, compared to 13,100 t in 1999. St. Cloud 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. The modern facility has a crushing and sizing capacity of 450 metric tons per day.

Pumice is found in the Jemez Mountains and the Mogollon-Datil volcanic field. Six operations were active in New Mexico.

Only one mine produces mica in New Mexico, the U.S. Hill Mine, near Velarde, in Taos County. It has operated since the mid-1960s. Mica is produced from a muscovite quartz schist of Proterozoic age. Oglebay Norton Co. acquired the mine in December 1999 from Franklin Industries Inc.

Gemstones and semiprecious stones produced in New Mexico include agate, azurite, fluorite, geodes, moonstone, onyx, peridot, smithsonite, and turquoise. Production statistics for 1998-2000 are withheld for gemstones and semiprecious stones. Depletion of the known deposits and difficulty in and expense of adhering to Federal, State, and local environmental regulations have closed most of the commercial mines.

Sulfuric acid was produced as a byproduct of copper smelting in Grant County. It is an important chemical used in many industrial applications, including copper recovery from SX-EW plants.

Helium was produced from the Shiprock and Ute Dome fields in the San Juan Basin. Helium is used in cryogenic applications, welding cover gas, pressurizing and purging, controlled atmospheres, leak detection, gas mixtures, and other uses.

Iron ore consisting primarily of magnetite was shipped from the magnetite tailings at Phelps Dodge's Cobre Mine in Grant County and was used by cement plants to increase the strength of their cement.

Although garnet was not produced in New Mexico in 1998-2000, at least one company was examining areas in the State for potential resources for use as an abrasive. Garnet typically is found in skarn deposits in southern and central New Mexico, and in some areas, garnet is a major constituent of waste rock piles remaining after recovery of metals.

Uranium is used as a fuel for nuclear reactors and has limited industrial applications as a heavy metal. Only one company in New Mexico, Quivira Mining Co. owned by Rio Algum Ltd. (successor to Kerr-McGee Corp.), produced uranium in 1998-2000 from waters recovered from inactive underground operations at Ambrosia Lake. Billiton Copper Holdings Inc., a wholly owned subsidiary of Billiton plc, made an offer to purchase Rio Algum Ltd. in late 2000.

References Cited

IMC Global Inc., 2001, Form 10K—Fiscal year 2000: Securities and Exchange Commission, 14 p.

Paydirt, 2000, EPA says it's still considering Superfund status for Questa: Paydirt, no. 737, p. 34.

Phelps Dodge Corp., 2001, Form 10-K—Fiscal year 2000: Securities and Exchange Commission, 92 p.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral		1998		1999		2000 p/	
		Quantity	Value	Quantity	Value	Quantity	Value
Clays:							
Common		33	173	W	W	W	W
Fire		1	17	1	W	--	--
Copper 3/		252	438,000	197	330,000	W	W
Gemstones		NA	W	NA	13	NA	W
Sand and gravel, construction		11,100	53,300	10,600	53,000	12,100	62,000
Stone:							
Crushed		4,940 4/	21,000 4/	3,720	22,200	3,500	21,500
Dimension	metric tons	W	W	17,900	2,320	6,600	831
Zeolites	do	(5/)	NA	(5/)	NA	(5/)	NA
Combined values of cement, gold, gypsum (crude), iron ore (usable), lime (2000), mica (crude), molybdenum concentrates, perlite (crude), potash, pumice and pumicite, salt, sand and gravel [industrial (1999-2000)], silver, stone [crushed sandstone and traprock (1998), dimension miscellaneous (1998)], and values indicated by symbol W		XX	341,000	XX	308,000	XX	727,000
Total		XX	853,000	XX	715,000	XX	812,000

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

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

2/ Data are rounded to no more than 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.

5/ Withheld to avoid disclosing company proprietary data.

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

Kind	1998 Number of quarries	1998 Quantity (thousand metric tons)	1998 Value (thousands)	1998 Unit value	1999 Number of quarries	1999 Quantity (thousand metric tons)	1999 Value (thousands)	1999 Unit value
Limestone	24 r/	2,140 r/	$8,390 r/	$3.92 r/	18	2,000	$7,750	$3.87
Granite	2	W	W	3.52	2	W	W	8.64
Sandstone	1	(2/)	(2/)	(2/)	--	--	--	--
Traprock	1	(2/)	(2/)	(2/)	--	--	--	--
Volcanic cinder and scoria	10	W	W	9.75	8	W	W	11.50
Miscellaneous stone	23 r/	1,040 r/	4,590 r/	4.43	15	364	2,060	5.66
Total or average	XX	4,940	21,000	4.25	XX	3,720	22,200	5.98

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable. -- Zero.
1/ Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
2/ Withheld from total to avoid disclosing company proprietary data.

TABLE 3
NEW MEXICO: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 1999, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Macadam	(3/)	(3/)	(3/)
Riprap and jetty stone	W	W	$5.87
Filter stone	W	W	5.00
Other coarse aggregate	W	W	4.00
Coarse aggregate, graded:			
Concrete aggregate, coarse	W	W	6.37
Bituminous aggregate, coarse	W	W	10.01
Bituminous surface-treatment aggregate	W	W	9.23
Railroad ballast	W	W	10.17
Other graded coarse aggregate	W	W	3.49
Fine aggregate (-3/8 inch):			
Stone sand, concrete	W	W	4.79
Stone sand, bituminous mix or seal	W	W	10.00
Screening, undesignated	W	W	5.50
Coarse and fine aggregates:			
Graded road base or subbase	167	$850	5.09
Unpaved road surfacing	(3/)	(3/)	(3/)
Terrazzo and exposed aggregate	W	W	23.29
Crusher run or fill or waste	14	69	4.93
Roofing granules	W	W	14.67
Other construction materials	56	285	5.09
Agricultural, poultry grit and mineral food	(3/)	(3/)	(3/)
Chemical and metallurgical, cement manufacture	W	W	3.86
Unspecified: 4/			
Reported	587	2,580	4.38
Estimated	440	1,700	3.95
Total or average	3,720	22,200	5.98

W Withheld to avoid disclosing company proprietary data; included in "Total."
1/ Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
2/ Includes granite, limestone, miscellaneous stone, and volcanic cinder and scoria.
3/ Less than 1/2 unit.
4/ Reported and estimated production without a breakdown by end use.

TABLE 4
NEW MEXICO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1999,
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
Construction:						
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/	214	2,830	69	418	--	--
Other construction materials	14	84	42	200	--	--
Agricultural 7/	(8/)	(8/)	--	--	--	--
Chemical and metallurgical 9/	W	W	--	--	--	--
Unspecified: 10/						
Reported	4	18	410	1,610	173	951
Estimated	150	590	280	1,100	--	--
Total	2,510	16,700	1,040	4,570	173	951

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes granite, limestone, miscellaneous stone, and volcanic cinder and scoria.
3/ Includes filter stone, macadam, riprap and jetty stone, and other coarse aggregate.
4/ Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), railroad ballast, and other graded coarse aggregate.
5/ Includes stone sand (bituminous mix or seal), stone sand (concrete), and screening (undesignated).
6/ Includes crusher run (select material or fill), graded road base or subbase, roofing granules, terrazzo and exposed aggregate, and unpaved road surfacing.
7/ Includes poultry grit and mineral food.
8/ Less than 1/2 unit.
9/ Includes cement manufacture.
10/ Reported and estimated production without a breakdown by end use.

TABLE 5
NEW MEXICO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1999,
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products	2,950	$14,000	$4.75
Plaster and gunite sands	234	1,590	6.81
Asphaltic concrete aggregates and other bituminous mixtures	973	6,550	6.73
Road base and coverings 2/	1,150	4,970	4.33
Fill	360	993	2.76
Other miscellaneous uses 3/	120	552	4.60
Unspecified: 4/			
Reported	2,150	10,300	4.78
Estimated	2,700	14,000	5.19
Total or average	10,600	53,000	4.99

1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes road and other stabilizations (cement and lime).
3/ Includes railroad ballast and snow and ice control.
4/ Reported and estimated production without a breakdown by end use.

TABLE 6
NEW MEXICO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1999,
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 and concrete products	2,660	12,200	285	1,840	--	--
Plaster and gunite sands	188	1,350	46	243	--	--
Asphaltic concrete aggregates and other bituminous mixtures	802	5,760	171	795	--	--
Road base and coverings 2/	629	2,810	520	2,170	--	--
Fill	227	569	133	424	--	--
Other miscellaneous uses 3/	55	245	65	307	--	--
Unspecified: 4/						
Reported	1,110	5,460	940	4,670	98	162
Estimated	1,900	9,100	840	5,000	--	--
Total	7,530	37,400	3,000	15,400	98	162

-- Zero.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes road and other stabilization (cement and lime).
3/ Includes railroad ballast and snow and ice control.
4/ Reported and estimated production without a breakdown by end use.