

# THE MINERAL INDUSTRY OF MONTANA

**This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and Montana Bureau of Mines and Geology for collecting information on all nonfuel minerals.**

Montana remained 28th in the Nation in nonfuel mineral production value<sup>1</sup> in 1997, according to the U.S. Geological Survey (USGS). The estimated value for 1997 was \$498 million, a 1% increase from that of 1996. This followed a 14.5% decrease from 1995 to 1996 (based on final 1996 data). The State accounted for more than 1% of the U.S. total nonfuel mineral production value.

Overall, metallic minerals accounted for 73% of the State's total nonfuel mineral value. By value, copper was Montana's leading nonfuel mineral, followed by gold. Portland cement was the State's third-leading nonfuel mineral commodity.

In 1997, large increases in the values of palladium, zinc, and platinum (*table 1*), plus smaller increases in portland cement and molybdenum, more than compensated for decreases in gold, copper, and silver. This resulted in a net gain in nonfuel mineral production value for the year. (All listings are in descending order of the magnitude of change.) Other values that increased in 1997 were industrial garnet, construction sand and gravel, and lime. Other values that decreased included those of industrial sand and gravel, gemstones, talc and pyrophyllite, and lead. All other mineral commodity values remained virtually the same.

In 1996, significant decreases of similar magnitude for both copper and gold, plus smaller decreases for bentonite and zinc accounted for most of the year's decrease in value. Relative to these changes, small increases occurred in 1996 in the values of lead, palladium, platinum, portland cement, molybdenum, construction sand and gravel, and talc.

Based on USGS estimates of the quantities produced in the 50 States in 1997, Montana continued as the only U.S. producer of primary platinum and palladium. The State remained first in the production of talc and pyrophyllite; third of three industrial garnet-producing States; fourth in lead; fifth in molybdenum and zinc; and sixth in gold and silver. Montana continued as one of the top five bentonite-producing States, but it dropped to fifth from fourth in the production of copper.

The following narrative information was provided by the

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<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 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/>.

Montana Bureau of Mines and Geology<sup>2</sup> (MBMG). Mining in Montana had a year of conflicting perspectives. For the most part, industrial mineral companies had a good year with growth, high prices, and increasing markets. Base metal prices were steady to lower, creating an atmosphere of further 'belt tightening' and resourcefulness. The gold industry took several direct impacts beginning with the Bre-X Minerals Ltd. scandal in Indonesia, which severely limited the availability of venture capital, followed by Australia's announcement that it had sold the majority of its gold reserves. The year ended with gold prices nearly \$100 per ounce less than in preceding years. This reduction created significant stress among producers whose annual reports indicated production costs at or above the selling price. Price hedging in advanced sales at higher prices will delay critical decisions for many gold producers. However, few companies are in a position to survive long periods of operating at a loss.

Mineral exploration reached a new low as the last of the major companies closed its Montana offices. Many corporate geologists had no stateside office to retreat to and found themselves employed in foreign countries, if employed at all. Exploration funds disappeared this year and it even seemed difficult for companies to generate funding for late-stage programs, at least partially because of the Bre-X scandal. Individual prospectors maintained very low levels of activity because the cost of holding claims remained high and the availability of prospective buyers was low.

A longstanding court case, Sierra Club Legal Defense Fund vs. Department of Agriculture (Forest Service), regarding Noranda Minerals Corp.'s Montanore project, challenged the validity of the initial prewilderness claims. The court sided with the Forest Service, verifying Noranda's existing rights and strengthening the company's position for patenting the property.

Beal Mountain Mining, a wholly owned subsidiary of Pegasus Gold, Inc., completed mining operations at its Beal Mountain Mine. Production from the South Beal ore body was completed in early October. The company expected to continue leaching the pads and then to rinse the remaining cyanide from the heaps before commencing final pad reclamation in 3 to 4 years. East of Lincoln, Phelps Dodge Corp. sold its interest in the McDonald Gold project to its joint venture partner, Canyon Resources Corp. Permitting of the project has been extremely slow. Although the draft Environmental Impact Statement was started a year ago, a product is not expected in the near future.

West of Townsend, Montana Tunnels Mining Inc. maintained steady production at its Diamond Hill Mine. The company continued an aggressive diamond drilling program to develop

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<sup>2</sup>Robin B. McCulloch, Staff Mining Engineer, authored the text of mineral industry information submitted by the Montana Bureau of Mines and Geology.

grade control and reserves. To date, four ore zones have been identified.

West of Jefferson City, Montana Tunnels' mining activity has produced ore at its lead-zinc-gold diatreme. Production was interrupted by pit-wall instability in midsummer when a slide on the north wall temporarily stopped production. The company had sufficient stockpiled ore from its Diamond Hill Mine to maintain mill production while mine production was stopped.

West of Malta, Zortman Mining Co.'s plans for an expansion of its Zortman gold and silver operation were again put on hold. An appeal to the consent decree was filed by the Island Mountain Protectors and the National Wildlife Federation, and by the Assiniboine, Gros Ventre, Fort Belknap Indian Council. This placed the decision for the Zortman expansion back into the courts for an expected 2 to 3 years.

Near Nye, the Stillwater Mining Co. has nearly completed the production-upgrade project started a couple of years ago for platinum-group metals. According to the company, the shaft has been completed and has achieved a production rate of 1,800 metric tons per day ore throughput, although the company is still plagued with a severe shortage of skilled miners and mine mechanics. The mill upgrade is complete, as is the base metal refinery. The smelter capacity is being expanded from 22 to 29 tons of concentrate per day.

Prices for platinum and palladium are up and have remained steady. In November, the Board of Directors authorized the remainder of funds for completion of a tunnel boring machine for the East Boulder project. Delivery is expected in May and the long access drift is expected to be completed in approximately 18 months.

TABLE 1  
NONFUEL RAW MINERAL PRODUCTION IN MONTANA 1/ 2/

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1995		1996		1997 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	33	90	34	W	34	W
Gemstones	NA	938	NA	1,840	NA	872
Gold 3/ kilograms	12,400	155,000	9,110	114,000	7,900	86,300
Iron ore, usable	5	60	--	--	W	W
Lead 3/ metric tons	8,350	7,790	7,970	8,580	8,000	8,320
Palladium kilograms	5,260	22,000	6,100	25,500	8,340	46,700
Platinum do.	1,590	20,800	1,840	23,500	2,500	31,700
Sand and gravel, construction	8,870	34,900	9,260	35,800	9,200	36,500
Silver 3/ metric tons	77	12,700	W	W	W	W
Stone, crushed	2,370 4/	9,920 4/	2,000	8,580	1,900	8,600
Zinc 3/ metric tons	22,700	27,900	19,400	21,900	22,300	39,800
Combined value of cement, clays (bentonite, fire), copper, garnet [industrial (1996-97),] lime, molybdenum, peat, sand and gravel (industrial), stone [crushed quartzite (1995), dimension miscellaneous], talc and pyrophyllite, and values indicated by symbol	W	XX	XX	251,000	XX	239,000
Total	XX	574,000	XX	491,000	XX	498,000

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; kind and value included with "Combined value" data.

TABLE 2  
MONTANA: 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	11	1,960	\$8,300	\$4.23	13	1,540	\$6,240	\$4.06
Traprock	4	289	1,150	3.98	3	W	W	8.30
Sandstone and quartzite	3 2/	112 2/	457 2/	4.08 2/	3	W	W	3.56
Volcanic cinder and scoria	1	6	16	2.67	1	3	9	3.00
Total	XX	2,370	9,920	4.19	XX	2,000	8,580	4.29

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

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

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

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

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse and fine aggregates: Other construction materials 4/	443	\$2,800	\$6.32
Chemical and metallurgical: Cement manufacture	(5/)	(5/)	3.97
Special: Mine dusting or acid water treatment	(5/)	(5/)	3.31
Unspecified:6/			
Actual	3	9	3.00
Estimated	613	2,030	3.30
Total	2,000	8,580	4.29

1/ To avoid disclosing company proprietary data, no district tables were produced for 1996.

2/ Includes limestone, quartzite, sandstone, traprock and volcanic cinder and scoria.

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

4/ Includes crusher run or fill or waste, other coarse aggregate, railroad ballast, riprap and jetty stone, stone sand (concrete), and unpaved road surfacing.

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  
MONTANA: 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 (including concrete sand)	959	\$4,840	\$5.05
Plaster and gunite sands	2	5	2.50
Asphaltic concrete aggregates and other bituminous mixtures	1,270	5,770	4.55
Road base and coverings 2/	4,150	15,600	3.75
Fill	347	739	2.13
Other miscellaneous uses 3/	458	1,820	3.98
Unspecified: 4/			
Actual	222	720	3.24
Estimated	1,850	6,350	3.42
Total or average	9,260	35,800	3.87

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

2/ Includes road and other stabilization (cement).

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

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

TABLE 5  
MONTANA: 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 aggregates (including concrete sand) 2/	694	3,410	268	1,430
Asphaltic-bituminous mixtures	656	2,820	613	2,950
Road base and coverings 3/	1,770	6,150	2,380	9,410
Fill	306	664	40	75
Other miscellaneous uses 4/	387	1,420	70	403
Unspecified: 5/				
Actual	204	656	18	63
Estimated	1,350	4,630	500	1,720
Total	5,370	19,700	3,890	16,000

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

2/ Includes plaster and gunite sands.

3/ Includes road and other stabilization (cement).

4/ Includes filtration, railroad ballast, and snow and ice control.

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