

THE MINERAL INDUSTRY OF IDAHO

This chapter has been prepared under a Memorandum of Understanding between the U.S. Bureau of Mines, U.S. Department of the Interior, and the Idaho Geological Survey for collecting information on all nonfuel minerals.

Idaho ranked 32d among the 50 States in total nonfuel mineral production value¹ in 1996, according to the U.S. Geological Survey (USGS). The State was 26th in 1995. The estimated value for 1996 was \$411 million, a 19% decrease from that of 1995. This followed a 24% increase from 1993 to 1994 and a 50% increase from 1994 to 1995 (based on revised final 1994 data and final 1995 data.) In 1996, the State accounted for more than 1% of the U.S. total nonfuel mineral production value.

Gold, by value, became the leading nonfuel mineral in Idaho in 1996; molybdenum was first in 1995 because of a significant increase in production from that of 1994 and higher market prices for the metal during the first half of the year. In 1996, most of Idaho's decrease in nonfuel mineral value was due to low molybdenum prices as compared to those of the first half of 1995 plus a small decrease in the metal's production. Industrial minerals, led by phosphate rock and construction sand and gravel, accounted for about 60% of the State's total nonfuel mineral production value. Of the remaining 40%, gold, molybdenum, silver, and lead, in descending order of value, were the leading metals.

The average price of molybdenum (contained in molybic oxide) increased from \$4.60 per kilogram in 1994 to \$17.50 per kilogram in 1995, and then declined to about \$7.50 per kilogram in 1996. Consequently, this accounted for much of the decline in the State's value of mineral production between 1995 and 1996. Whereas value changes occurring for most other mineral commodities during 1996 were small relative to those of molybdenum, moderate increases in lead and gold (up \$7 million) more than offset the lowered values of construction sand and gravel (down \$5.8 million) and phosphate rock. In 1996, other nonfuel mineral values that increased were those of silver, lime, vanadium ore, dimension quartzite, zinc, antimony, natural gemstones, and masonry cement. Other nonfuel minerals that decreased in value included portland cement, crushed stone, garnet, copper, and pumice and pumicite.

Compared with USGS estimates of quantities produced in the other 49 States in 1996, Idaho remained the only State to produce vanadium ore and antimony, the second largest producer of two garnet-producing States, third in silver and lead, fourth in molybdenum and pumice, and sixth in gold. The State rose from third to second of

four phosphate rock-producing States. Additionally, significant quantities of construction and industrial sand and gravel and lime were produced in the State.

The following narrative information was provided by the Idaho Geological Survey² (IGS). Production data in the following text are those reported by the IGS, based on its own surveys and estimates. They differ from some production figures reported to the USGS. Idaho set another new State record of 10,800 kilograms of gold poured last year. This surpasses the 1995 mark of 9,330 kilograms. The leading producer of Idaho's six major gold mines was Meridian Gold Inc.'s new Beartrack Mine in Lemhi County with 3,380 kilograms of gold recovered. The company changed its name from FMC Gold Co. after being spun off from FMC earlier in the year. Meridian did extensive drilling for new ore between the two pits. Pegasus Gold Corp.'s Black Pine Mine, which opened in 1991, poured 2,730 kilograms. The company continued mining the C/D pit and NE Tolman pit as it started planning for closure of its Cassia County operation in 1997. Hecla Mining Co.'s Grouse Creek Mine in Custer County recovered 2,370 kilograms of gold and 10,590 kilograms of silver. Hecla announced that it also will be shutting down in 1997 after mining of the Sunbeam pit is completed. Operations were shut down from May to July while the Grouse Creek tailings dam was raised 12 meters to hold the rest of the Sunbeam tailings. The Grouse Creek deposit, which has a high stripping ratio, will be left unmined. Kinross Gold Corp. was mining 1,370 kilograms of gold and 36,700 kilograms of silver from both the DeLamar Mine and the newly opened, adjacent Stone Cabin Mine in Owyhee County, respectively. Kinross added a Knelson Concentrator to its mill circuit. At Dakota Mining Corp.'s seasonal Stibnite Mine in Valley County, the original West End pit was mined out and new gold mining started at the Stibnite Pit. Dakota also had an extensive program of exploration and delineation drilling. Seasonal gold operations continued at United States Antimony Corp.'s Yellow Jacket Mine in Lemhi County and CSC Mining Co.'s Rescue Mine in Warren. Thompson Creek Mining Co. was at full production at the Thompson Creek molybdenum mine near Challis. The company added a shovel and loader and built a pyrite reduction plant to remove 80% of the pyrite from the mill tails before they go to impoundment.

The pace of mining and exploration work in the famous Coeur d'Alene District increased because of new discoveries, good lead prices, and moderate silver prices. According to the IGS, total silver production in the Valley increased from approximately 106 metric tons³ in 1995 to 190 tons in 1996. Sunshine Mining and Refining Co. returned the Sunshine Mine to nearly full production, increasing output by 50% in 1996 to 80 tons of silver plus 1,160 tons of lead and 305 tons of copper. Development of the West Chance discovery was completed on the 940 meter and 1,100 meter levels. Hecla increased production of silver (60 tons in 1996) and lead (18,750 tons) at the Lucky Friday Mine. Hecla also had a major exploration project near the old Gold Hunter silver-lead mine, located 1,200 meters north of the Friday. Drilling from the new 1,500 meter level drift of the Friday intersected high silver grades along the Gold Hunter vein. Hecla continues to evaluate the new deposit. Silver Valley Resources Corp., a joint venture of ASARCO Incorporated and Coeur d'Alene Mines Corp., did development mining at the Coeur Mine, extracting about 50 tons of silver. They plan to reopen the Galena Mine in 1997.

May 26, 1996, marked the end of an era in the Silver Valley. The stacks of Bunker Hill Mine's smelter and zinc plant were razed. Built in 1976, the smelter stack was 218 meters tall and a local landmark. Environmental work in the Silver Valley continued, but was set back by early spring flooding. Over 1,000 residential lawns have already been replaced with new soil with about 600 remaining.

Phosphate is the largest mineral industry in the State. This includes both phosphate rock and processed elemental phosphorus. The four southeastern Idaho mines, FMC Corp.'s Dry Valley Mine, J. R. Simplot Co.'s Smokey Canyon Mine, Rhône-Poulenc Basic Chemical Co.'s Rasmussen Ridge Mine, and Monsanto Co.'s Enoch Valley Mine, extract more than 5.9 million tons of ore per year. Value of the ore and processing, conducted at Soda Springs and Pocatello, was estimated at over \$660 million for 1995. This contributed to a total value of more than \$1 billion for Idaho's mineral production. Mines and plants, including Kerr-McGee Corp.'s vanadium extraction plant and Agrium Inc.'s fertilizer plant that processes ore mined by Rhône-Poulenc Basic Chemical Co., were operating at full capacity. A major footwall failure at Dry Valley destroyed a shovel, but there were no injuries. At least two companies did exploration drilling, and Federal Agencies continued writing the Environmental Impact Statements for two new proposed lease areas, Manning Creek and the Dairy Syncline. Rhône-Poulenc won the State's soft rock reclamation award for efforts at Rasmussen Ridge, and Monsanto Co.

assisted the dwindling population of Western big-eared bats by building an artificial bat cave in a reclaimed portion of their mine.

Aggregate demand continued to be strong because of an active construction industry fueled by rapid growth, particularly in the urban areas. Ash Grove Cement West Inc. and dimension stone quarries also reported increased sales. In Malad, Hess Pumice Products opened a second grinding plant, designed exclusively for their mined mineral, a fine pumice used for polishing television screens. Products from the new \$3-million facility, opened in April, are exported to many countries. Also in Malad, the National Perlite Products Co. plant and Oglebay-Norton Co.'s mine was bought by Idaho Minerals Inc., a subsidiary of Moneta Porcupine Mines Inc. of Timmins, Ontario. Idaho Minerals planned to build a new, modern facility near Virginia, ID, to better access rail transport. Emerald Creek Garnet Co., the Nation's largest garnet producer, and other industrial mineral operations continued.

Exploration projects in Idaho principally targeted precious metals, but cobalt, base metals, and phosphate also attracted interest. Noteworthy exploration projects in north Idaho were conducted by Idaho Consolidated Metals Corp. (ICMC) and Cyprus Amax Minerals Co. in the Orogrande Shear Zone west of Elk City in Idaho County. ICMC acquired the Buffalo Gulch deposit, previously drilled and permitted by Bema Inc., in 1990, but never mined.

Major exploration projects in Lemhi County included Formation Capital Corp.'s Sunshine project in the Blackbird Mining District. A 6,400-meter drilling program and major mapping and sampling effort targeted syngenetic cobalt-copper-gold mineralization on the large property. Environmental remediation work, lead by the U.S. Environmental Protection Agency, was underway on the adjacent patented claims at Blackbird. Cominco Ltd. also drilled in the Iron Creek area, and Double Creek Mining Co. drilled the Salmon Canyon copper prospect on the northwest end of the Idaho Cobalt Belt. Atlas Precious Metals Inc. acquired the Musgrove project, and American Gold Resources Corp. was bought by Ashanti Goldfields Corp. Ltd. (Ghana), an African company, that was trying to sell its Ditch Creek and Arnett Creek properties near Salmon.

In central Idaho, USMX Inc. was conducting baseline studies and permitting activities after the company filed a notice to operate a seasonal heap-leach open pit gold mine at the Dewey property in the Thunder Mountain mining district. The mine plan calls for a yearly production of about 1,200 kilograms of gold and double that in silver over the 5- to 6-year mine life. Dakota was exploring at its Stibnite property, and Dakota and Hecla agreed to

jointly develop the sulfide resource at Stibnite. In Custer County, Cambior USA Inc. drilled more than 20 core holes on the Sultana project at the Empire Copper Mine in search of skarn-related copper-gold mineralization. Biomyne Inc. drilled a hole near Ketchum, and Curator American (a subsidiary of International Curator Resources Ltd.) abandoned their DSA project in part because of the opposition of local environmentalists. Ownership of the Atlanta project in Elmore County changed hands when Ramrod Gold Corp. was taken over by Quest International Resources Corp., which is conducting a feasibility study of the 31-ton gold resource.

Gold exploration in southwestern Idaho included drilling by Golconda Mining Corp. at the Consolidated Mercury prospect in Washington County and drilling and trenching by International Freegold Minerals Development Inc. at the Idaho Almaden Mine east of Weiser. Echo Bay Exploration Ltd. explored the Kilgore prospect in Clark County of eastern Idaho. They drilled 4,900 meters of cores, with helicopter support, and 3,400 meters of reverse circulation rotary on the epithermal, volcanic-hosted system and received a Land Board award for their environmental work on the site.

¹The terminologies "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 1996 USGS mineral production data published in this chapter are estimates as of February 1997. For some commodities (for examination, 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>

²Virginia Gillerman, Research Economic Geologist, authored the text of the Idaho mineral industry information submitted by the Idaho Geological Survey.

³All tons are metric unless otherwise specified.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1994		1995		1996 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays	--	--	1	10	1	10
Gemstones	NA	287	NA	346	NA	365
Gold 3/ kilograms	W	W	8,850	110,000	9,300	117,000
Sand and gravel:						
Construction	14,500	46,300	13,200	43,500	11,600	37,700
Industrial	W	W	501	8,720	641	8,720
Silver 3/ metric tons	W	W	182	30,200	194	33,100
Stone (crushed)	4,160	20,300	3,210 4/	14,000 4/	2,800 4/	12,600 4/
Combined value of antimony, cement, copper, feldspar, garnet (industrial), lead, lime, molybdenum, phosphate rock, pumice and pumicite, stone [crushed miscellaneous (1995-96), dimension marble and miscellaneous (1994), dimension quartzite (1995-96)], vanadium ore, zinc, and values indicated by symbol W	XX	273,000	XX	303,000	XX	202,000
Total	XX	340,000	XX	510,000	XX	411,000

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
IDAHO: CRUSHED STONE 1/ SOLD OR USED BY PRODUCERS
IN 1995, BY USE 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	W	W	\$3.60
Filter stone	5	\$33	6.60
Other coarse aggregate	159	572	3.60
Coarse aggregate, graded:			
Concrete aggregate, coarse	W	W	1.10
Bituminous aggregate, coarse	95	378	3.98
Bituminous surface-treatment aggregate	15	40	2.67
Railroad ballast	W	W	6.29
Fine aggregate (-3/8 inch):			
Stone sand, bituminous mix or seal	22	86	3.91
Screening, undesignated	1	5	5.00
Coarse and fine aggregates:			
Graded road base or subbase	674	2,640	3.92
Unpaved road surfacing	123	550	4.47
Crusher run or fill or waste	153	649	4.24
Other construction materials	14	70	5.00
Chemical and metallurgical:			
Cement manufacture	328	661	2.02
Lime manufacture	400	2,000	5.00
Flux stone	231	1,160	5.02
Special: Other fillers or extenders	9	124	13.80
Unspecified: 3/			
Actual	847	4,430	5.23
Estimated	136	590	4.34
Total	3,210	14,000	4.36

W Withheld to avoid disclosing company proprietary data; included with "Other construction materials".
1/ Includes granite, limestone, quartzite, shell, traprock, and volcanic cinder and scoria; excludes miscellaneous stone 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 production reported without a breakdown by end use and estimates for nonrespondent

TABLE 3
IDAHO: CRUSHED STONE SOLD OR USED, BY KIND 1/

Kind	1994				1995			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	6	407	\$1,400	\$3.44	8	873	\$3,380	\$3.87
Granite	8 r/	356 r/	1,930 r/	5.42 r/	8	611	3,370	5.52
Traprock	31	2,230	9,440	4.24	30	1,390	5,700	4.10
Shell	2	W	W	4.08	1	8	42	5.25
Volcanic cinder and scoria	1	W	W	5.67	--	--	--	--
Quartzite	7	556	4,800 r/	8.63 r/	7	328	1,500	4.58
Miscellaneous stone	7 r/	567 r/	2,540 r/	4.49 r/	(2/)	(2/)	(2/)	(2/)
Total	XX	4,160	20,300	4.89	XX	3,210	14,000	4.36

r/ Revised. 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 miscellaneous stone from State total to avoid disclosing company proprietary data.

TABLE 4
IDAHO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1995,
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate and concrete products 2/	1,800	\$7,580	\$4.22
Asphaltic concrete aggregates and other bituminous mixtures	1,700	7,080	4.16
Road base and coverings	4,730	15,200	3.22
Fill	917	2,140	2.33
Snow and ice control	108	426	3.94
Railroad ballast	20	73	3.65
Other 3/	94	290	3.09
Unspecified: 4/			
Actual	1,290	3,510	2.73
Estimated	2,540	7,210	2.83
Total or average	13,200	43,500	3.30

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

2/ Includes plaster and gunite sands.

3/ Includes filtration.

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