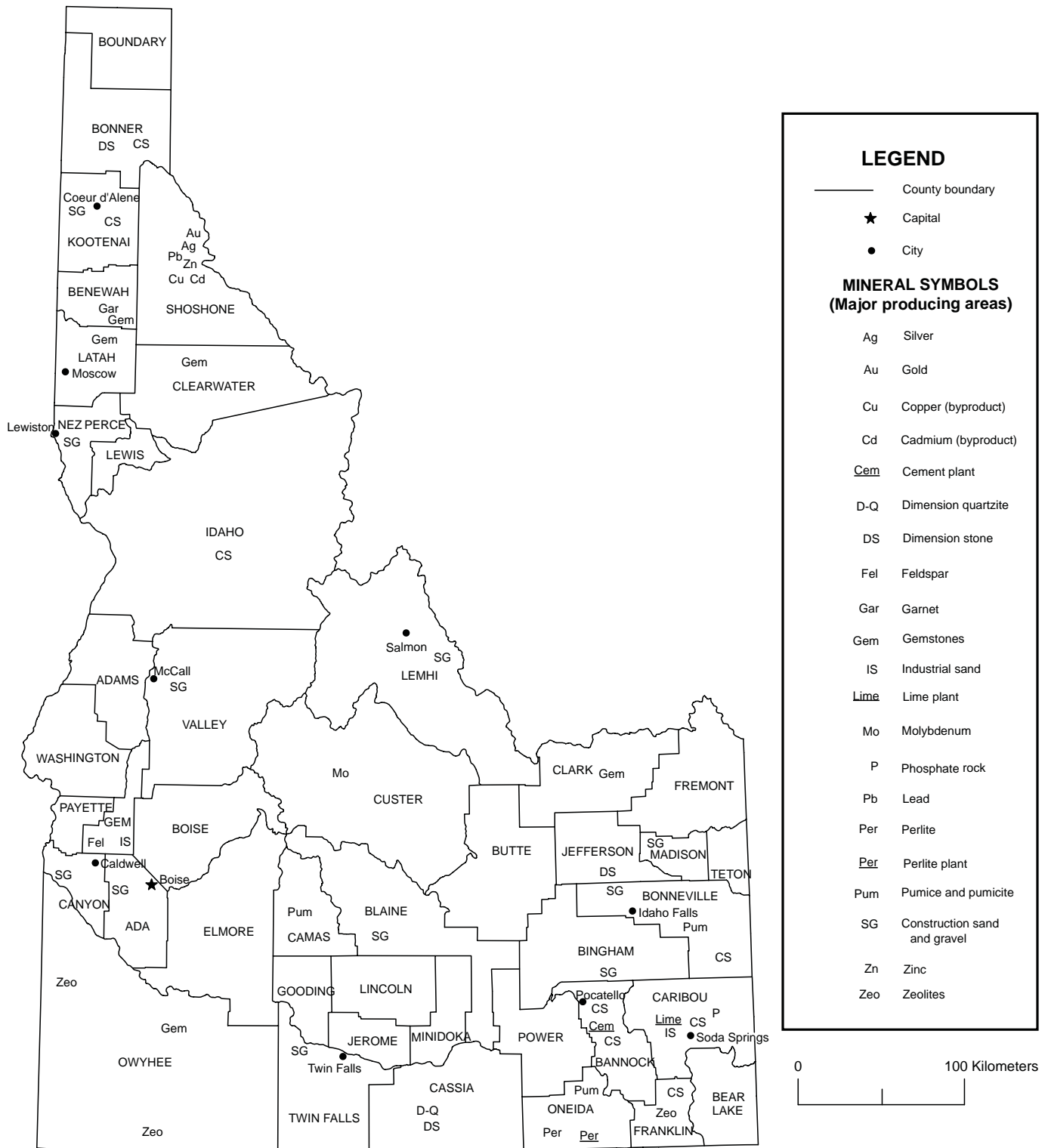




2005 Minerals Yearbook

IDAHO

IDAHO



Source: Idaho Geological Survey/U.S. Geological Survey (2005)

THE MINERAL INDUSTRY OF IDAHO

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

In 2005, Idaho's nonfuel mineral production was valued¹ at \$906 million based upon annual U.S. Geological Survey (USGS) data. This was a nearly 103% increase from the State's total nonfuel mineral value for 2004, which was up slightly more than 66% from that of 2003. The State climbed to 21st from 34th in rank among the 50 States in total nonfuel mineral production value, of which Idaho accounted for more than 1.6% of the U.S. total value. Yet, per capita, the State ranked seventh in the Nation in its minerals industry's value of nonfuel mineral production; with a population of about 1,430,000, the value of production was about \$634 per capita.

Molybdenum concentrates, phosphate rock, construction sand and gravel, silver, portland cement, crushed stone, and lead were, in descending order of value, Idaho's leading nonfuel minerals and accounted for more than 97% of the State's total nonfuel mineral production value in 2005. Industrial minerals accounted for about 29% of the State's total nonfuel mineral value; molybdenum concentrates, silver, lead, copper, zinc, and gold (descending order of value) accounted for the remainder. In 2005, the largest increases in value were for molybdenum concentrates and construction sand and gravel. A substantial increase in molybdenum concentrate production and a significantly more substantial increase in the commodity's unit value (specific data withheld—company proprietary data) led the State's increase in total nonfuel mineral production value for the year. A \$19.5 million, or 26%, increase in the total value of construction sand and gravel resulted from a 6% increase in its production and a nearly 19% increase in the commodity's average unit value. Significant increases also took place in the production and the values of crushed stone and lead, as well as in the overall value and average unit value of phosphate rock, the production of which was down, slightly (table 1). The largest decrease in value took place in silver, down about \$2 million, despite an approximate 10% increase in unit value.

During the past 7 years, the relative values of metals and of industrial minerals, each as a percentage of the State's total nonfuel mineral production value, have fluctuated significantly. From a relatively recent high of 45% in 1999, the percentage of metals dropped to 28% in 2001², increased to 29% in 2002 and 30% in 2003, after which it rose sharply to 48% in 2004.

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the 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 2005 USGS mineral production data published in this chapter are those available as of December 2006. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

²The State's lower percentage of metals value of 2001 resulted in large part because of a substantial decrease in gold production in 2001 from that of 2000, which continued to decrease significantly in 2002 mostly as a result of the closing down of operations at the Beartrack Mine in Lemhi County. Gold production ceased in the State during 2003 but resumed in 2005.

However, in 2005, the percentage of metals value rose even more sharply to a reversal of the percentages of 2003 with the values of metals reaching more than 71% and industrial minerals about 29% of the State's total nonfuel mineral production value. Although increases in the values of lead, silver, and zinc were part of this rise in metal production value from 2003 through 2005, the largest portion of this dramatic increase was owing to a substantial increase in the average price of molybdenum concentrates mined from Thompson Creek Mining Co.'s large open pit molybdenum mine in Custer County. The trend toward the recent heights in molybdenum concentrate prices began in June 2002 and continued on throughout 2003 and 2004, peaking in 2005. For example, as reported in Platts Metals Week (there in dollars per pound of contained molybdenum) the annual average price of molybdic oxide rose from \$8.27 per kilogram (kg) in 2002 to \$11.75 per kg in 2003 to \$36.73 per kg in 2004 and nearly doubled to \$70.10 per kg (about \$32 per pound) in 2005. In June 2005, the monthly average molybdic oxide price reached its highest point of the 4-year run at \$82.54, and then followed a generally downward trend the rest of the year to close at \$61.84. Molybdenum concentrate prices had stayed relatively level during the early months of 2006.

In 2005, Idaho continued to rank second in the quantity of zeolites produced, second of three industrial-garnet-producing States, third in silver and lead (descending order of value), and fourth in molybdenum concentrates. The State decreased to third from second of four phosphate rock-producing States, to fifth from third in pumice and pumicite, to eighth from fifth in gemstones (gemstones based upon value), and it continued to be a significant producer of construction sand and gravel and industrial sand and gravel.

The Idaho Geological Survey³ (IGS) provided the narrative information that follows. Production data in the text that follows are those reported by the IGS and are based on the agency's own surveys and estimates or information gathered from company annual reports. They may differ from production figures published by the USGS. Mining employment for the last quarter of 2005 was 2,130 persons, about 8.7% more than the annual number for 2004. In 2004, employment at the State's metal and nonmetal mines increased more than 10% to 1,960 compared with 1,769 in 2003. Putting this in a larger perspective, these numbers did not include the approximately 1,000 workers at three large phosphate-processing chemical plants in southeastern Idaho.

With Idaho's nonfuel mineral production value more than doubled in 2005, the \$906 million that was reached was a new record high for the State. The increase in value of molybdenum concentrates was more than 250%, due in part to the increase in production, but more so to the increased price of molybdic

³Virginia S. Gillerman, Associate Research Geologist/Economic Geologist, authored the text of the State mineral industry information provided by the Idaho Geological Survey.

oxide, as well as that of ferromolybdenum. In addition to record prices for molybdenum, higher prices for silver and the base metals boosted the value of metals during the year. Ores of silver, along with those containing lead, copper (in one mine), and zinc were extracted from two underground mines in the Coeur d'Alene District in Shoshone County, still producing silver after 120 years of mining. In 2004, the IGS updated Idaho's historic gold production data. From 1978 through 2004, nearly 77,800 kg (about 2.5 million troy ounces) of gold was mined, principally from open pit operations in the State. That raised the State's total historic gold production to close to 386,000 kg (12.4 million troy ounces). Although Idaho is not a major gold-producing State, the relatively recent high prices on the market fueled several exploration projects, and a new small gold mine, New Jersey Mining Co.'s Golden Chest Mine, opened at Murray in eastern-central Shoshone County.

The State's industrial minerals sector was generally in a steady to growing state as compared with the past several years. Idaho's construction boom and a robust economy continued to create an active raw minerals and materials demand, especially for aggregate, cement, and dimension stone. Three large open pit phosphate mines and three associated processing plants continued to operate, one in Bannock County and the other two in Caribou County, in southeastern Idaho.

Exploration and Development Activities

Industrial Minerals

Exploration for industrial minerals mainly was limited to the search for phosphate rock and to I-minerals Inc.'s Helmer-Bovill feldspar-clay-quartz project in Latah County. I-minerals collected a 36-metric-ton (t) [40-short-ton (st)] bulk sample of potassium feldspar for metallurgical testing to be performed in a North Carolina facility. The company also drilled 35 HQ core holes in the Kelly's Basin area to evaluate that area's feldspar grades. J.R. Simplot Co.'s draft environmental impact statement (EIS) for a controversial expansion into the Manning Creek lease in Caribou County was released at year's end, and the company conducted another large drilling program on its Dairy Syncline lease, also in Caribou County.

Metals

Cobalt.—In eastern central Idaho, Formation Capital Corp.'s Idaho Cobalt Project in Lemhi County was one of the largest development projects in the State. Formation Capital and its contractors worked on the EIS for its proposed new cobalt/copper/gold underground mine. A preliminary draft EIS was released by the Salmon-Challis National Forest at yearend and was scheduled to be released to the public in the spring 2006. Exploration drilling in 2005 generally was hampered by poor ground conditions early in the year; nevertheless by yearend, about 2,040 meters (m) of drilling in 11 diamond drill holes had been completed. In the R05-07 hole, the company intersected a nearly 4.5-meter wide zone that assayed at 0.98% cobalt, 0.19% copper and 0.0521 troy ounces per short ton [1.62 grams per short ton (g/st) or about 1.79 grams per metric ton g/t)] gold at the 122 m (400 feet) depth. A new feasibility study and reserve

update on the Ram deposit were due to be completed in early 2006.

Gold.—New Jersey Mining Co. (Kellogg, ID) drilled four diamond drill holes totaling 610 m in the Idaho vein at its Golden Chest Mine, and intersected one 2.4-m intercept (section) that assayed 23.3 g/t (about 0.68 troy ounces per short ton) gold. New Jersey Mining also received its permit from the U.S. Forest Service in July to open the Silver Strand Mine, northeast of Coeur d'Alene. This underground mine operation will exploit a high-grade gold-silver vein in the Revett Formation; mine construction was to begin in 2006. The seasonal operation plan was to mine about 5,000 metric tons per year of ore to be processed at its Kellogg mill.

To the south in north central Idaho, Valencia Ventures, Inc. held the Petsite gold project property at Orogrande, Idaho County. Vista Gold Corp. continued to hold the Stibnite gold property in Valley County. American Independence Mines and Minerals, Inc. did surface preparation work at the Golden Hand lode mine project, north of Edwardsburg in the Payette National Forest. At Warren, Kimberly Gold Mines, Inc. drilled four short holes (underground) at the Rescue Mine in central Idaho to test the gold-quartz vein intersects.

In Lemhi County, Journey Resources Corp. picked up the Musgrove Creek property from Wave Exploration Corp., which drilled the property in 2004. The deposit holds an NI43-101 resource of about 9,770 kg (314,000 troy ounces) of gold (Association of Professional Geoscientists of Ontario, 2003⁴), and to the east in Clark County, Kilgore Minerals, Ltd. continued to hold the Kilgore gold property.

Twin Mining Corp. [the owner of Atlanta Gold Corporation of America, Inc.] worked on permitting studies, including air and water monitoring and mine planning, for its proposed open pit heap-leach gold mine at Atlanta, Elmore County, in southwestern Idaho. The Atlanta Gold project, which hosts a reserve of 12.3 t of ore at 2.1 g/t (0.06 troy ounces per st) gold and 5.5 g/t (0.16 troy ounce per st) silver, is at the headwaters of the Middle Fork of the Boise River. However, financing problems delayed the project, which had been meeting with opposition from the Idaho Conservation League, in part owing to difficulties with arsenic-bearing drainage from an old adit. The two parties negotiated a solution in October, whereby Atlanta agreed to install a water-treatment system with the eventual objective of designing a passive treatment facility to take care of the problematic adit drainage (Gillerman, Weaver, and Bennett, 2006[§]). Additionally, many people nearby and in the surrounding areas were concerned about cyanide use at the Atlanta project. A much smaller project in the Neal District, closer to Boise, also received much public scrutiny over its application (later withdrawn) for a cyanide permit.

Molybdenum.—Molybdenum was the exploration target for Kobex Resources Ltd., which picked up the Cumo property from Mosquito Consolidated Gold Mines Ltd. in March. The deep moly deposit was discovered by Amax Exploration Inc. in the 1970s, and nearly 11,000 m of drilling defined about 1.18 billion t ore grading at 0.093% molybdenum sulfide with a higher grade core. The deposit is located near the headwaters

⁴References that include a section mark (§) are found in the Internet References Cited section.

of Grimes Creek in a remote part of Boise County. Drill permits were received late in the year.

Silver.—Since 1884, northern Idaho's Coeur d'Alene District in Shoshone County has produced about 36.7 million kg (more than 1.18 billion troy ounces) of silver from high-grade, quartz-siderite-sulfide veins with copper and/or lead byproduct credits. Silver prices rose to about \$270 per kilogram (as much as \$8.50 per troy ounce) during the year, helping to fund the Gold Hunter expansion project at Hecla Mining Co.'s Lucky Friday Mine in Mullan. An additional 610 m (2,000 feet) of drift was completed on the 1,800-m level (5,900-foot) access from the mine's Silver Shaft, plus lateral drifting along the vein and installation of I drifts. Exploration drilling down to the 1,950-m level successfully tested one-half the strike length of the vein, helping to result in a doubling of reserves. Mill improvements also were made. Coeur d'Alene Mines Corp. implemented an aggressive exploration program, targeting fault-hosted high-grade veins with a 17,700-meter (58,000-foot) drill program. While still producing more than 2 million troy ounces of silver in 2005, production for the year dropped off at Coeur d'Alene Mines' Coeur Silver Valley operations, which encompassed the Coeur Mine and the Galena Mine (Shoshone County) because of reduced access to areas of the mine that were undergoing redevelopment (Coeur d'Alene Mines Corporation, 2006).

Sterling Mining Co. continued to evaluate and rehabilitate the Sunshine Mine, an 11.2-million-kg (360-million-troy ounce) life-of-mine silver producer that it acquired in 2003. The primary hoists of the mine's Jewell Shaft were reconditioned, including new hoist cables, and these were operational down to the 945-m level (3,100-foot) as of April 2004. Spencer Engineering of Ontario, Canada, was hired to refurbish the ventilation and escapeway systems at the Silver Summit Mine and Silver Dollar Tunnel portions of the mine that were in need of work to meet strict Federal mine hoist regulations. The company acquired properties next to the Sunshine and planned drilling of geophysical and geologic targets on the Yankee Girl vein structures.

Other Metals Projects.— Timberline Resources Corp. drilled 10 core holes, totaling 1,250 m, at its Snowstorm Project to test for stratabound copper-silver mineralization in the Revett Formation in northern Idaho, Shoshone County. In southern Idaho's Custer County in the Mackay District, Trio Gold Corp. drilled 10 holes totaling more than 700 m early in the year to test for copper mineralization in skarn and evaluate solvent extraction processing. Unity Gold-Silver Mines Inc. and Sidney Resources Corp. also worked claims in and near the Warren Minerals District, Idaho County.

Commodity Review

Industrial Minerals

Dimension Stone.— Dimension stone operations, including those for Oakley Stone in Cassia County, and L and W Stone Corp.'s quarry in Custer County, had productive years concurrent with the strong housing market. In a ruling on a suit aimed at stopping a previously approved expansion of L and W Stone's operation at Three Rivers Stone flagstone quarry

west of Challis, a judge allowed the company to continue operations, with the requirement that the company prepare a full EIS with the U.S. Department of the Interior's Bureau of Land Management regarding the expansion. The quarry ships more than 27,200 t of stone in a season (Gillerman, Weaver, and Bennett, 2006§). In a joint venture with Hess Pumice Products, Inc., Owens-Corning built a manufacturing plant at Malad to produce a manufactured stone veneer called Cultured Stone, popular in construction.

Phosphate Rock.—Three companies, Agrium Inc., J.R. Simplot Co., and Monsanto Co., extracted and processed more than 4 million metric tons of ore from the Permian Phosphoria Formation in Caribou County in southeastern Idaho. Although phosphate rock production and the commodity's market were stable, for the second consecutive year phosphate was surpassed in raw ore value by a metal (molybdenum concentrates). Prior to 2004, when molybdenum concentrates was the nonfuel mineral leader by value, phosphate rock had led the State's nonfuel minerals since 1997; gold was first in 1996.

J.R. Simplot had an active and profitable year at its Smoky Canyon Mine, which was near the Wyoming border, and at its fertilizer plant in Pocatello in southeastern Idaho. Agrium, Inc. had been mining the Rasmussen Ridge Mine, but the company mothballed that facility and moved south to the Dry Valley Mine, which it purchased from Astaris Corp. in 2004. Agrium mined at Dry Valley for the second half of the year. Monsanto operated its South Rasmussen Mine, doing extensive concurrent reclamation with drilling and mining; the company also initiated permitting for a new project in southeastern Idaho, the Blackfoot Bridge Mine, 14 kilometers northeast of Soda Springs, Caribou County.

Other Industrial Minerals.—In northern Idaho, Emerald Creek Garnet Co. began trammel mining in the spring on its new alluvial garnet leases along the St. Maries River. Production increased at the Ash Grove Cement Co. cement facility in the southeast at Inkom; the volume of cement orders was up about 25% in the Boise Valley. Construction sand and gravel production was up, particularly in the rapidly developing urban areas near Boise, Coeur d'Alene, and parts of eastern Idaho. In far southeastern Idaho, production increased at the Bear River Zeolite Co., Inc.'s zeolite mine at Preston and at Hess Pumice Product's Wrights Creek pumice mine and plant at Malad. Hess Pumice added 50 employees and a second shift at the mine to supply a large increase in pumice needed for its new lightweight aggregate facility. Idaho Minerals Co. [a subsidiary of Hess] also opened a new plant in Malad to expand its mined crude perlite for use in potting soil.

Metals

Metal mine production in Idaho consisted mainly of molybdenum concentrates, silver, and lead (descending order of value); in comparatively lesser quantities, copper, zinc, gold, and cadmium (byproduct in zinc concentrates) (descending order of value) also were produced.

Gold.—New Jersey Mining Co., based in Kellogg, shipped its first gold concentrate from its underground Golden Chest Mine at Murray to the Barrick Goldstrike Mines Inc. facility

in Nevada. New Jersey Mining was mining gold ore from the Katie-Dora gold-quartz vein at a rate of 400 tons per month and trucking the ore to its mill in Kellogg, which included a flotation and gravity circuit. Also, Star Materials operated a gold placer mine in Butte Gulch, near the Golden Chest, east of Murray.

Molybdenum.—Molybdenum concentrates production in Idaho took place at the Thompson Creek Mining Co.'s Thompson Creek Mine in Custer County. The molybdenum industry experienced another year of molybdenum prices that were substantially higher than the year before as Thompson Creek mined ore from phase 5 in the bottom of its large, open pit mine west of Challis, Custer County. The company purchased five new haul trucks to assist with the phase 6 stripping operation and replaced the conveyor that went from the mine to the mill.

Silver.—Almost 140,000 kg (4.5 million troy ounces) of silver was produced at the two operating mines in the Coeur d'Alene District. Silver production at Hecla Mining Co.'s Lucky Friday Mine was about 75,300 kg (2.42 million troy ounces). Hecla's employment increased to about 160 workers. Coeur d'Alene Mines Corp. operated the Coeur Silver Valley Mine (the former Galena Mine), producing nearly 64,100 kg (2.06 million troy ounces) during the year; that was somewhat less than expected owing to lower grades and shorter vein lengths in some headings.

Environmental Issues and Mine Reclamation Awards

Public concern regarding proposed gold mines near Boise that would use cyanide prompted a reexamination and strengthening of the State's regulations and cyanide permitting processes. With the claims surrounded by one of central Idaho's pristine wilderness areas, the Frank Church—River of No Return Wilderness, Thunder Mountain Gold, Inc., and the Dewey

Mining Company sold the historic Dewey gold mine in the Thunder Mountain Mining District in Valley County with its patented and unpatented mining claims to the Trust for Public Lands. The Trust planned to convey the 260-hectare-property to the Payette National Forest.

Kinross DeLamar Mining Co. received the Northwest Mining Association's Environmental Excellence Award in 2005 for its reclamation work at the closed DeLamar (silver) and Stone Cabin (gold and silver) Mines in Owyhee County. Monsanto received the 2004 Environmental Excellence Award of the Idaho Association of Commerce and Industry for innovative mining and reclamation practices that reduce the likelihood of selenium leaching.

Government Programs

During 2005, the IGS released 35 new publications, most of which were made available on the IGS Web site at URL www.idahogeology.org. New geologic mapping was released for areas around Sandpoint in northern Idaho and the Twin Falls 30x60 minute quadrangle and the Blaine County regions in south-central Idaho. The mines and prospects database and many abandoned mine lands inventory reports can be accessed at the IGS Web site.

Internet References Cited

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TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN IDAHO^{1,2}

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2003		2004		2005	
	Quantity	Value	Quantity	Value	Quantity	Value
Gemstones	NA	477	NA	836	NA	469
Sand and gravel, construction	16,500	59,300	19,600	74,300	20,800	93,800
Stone, crushed	3,160	15,700	3,420 ^r	18,100 ^r	4,450	23,900
Combined values of cadmium (byproduct of zinc concentrates [2004-05]), cement (portland), copper, feldspar, garnet (industrial), gold (2003, 2005), lead, lime, molybdenum concentrates, perlite (crude), phosphate rock, pumice and pumicite, sand and gravel (industrial), silver, stone (dimension quartzite and sandstone), zeolites (2004-05), zinc	XX	193,000	XX	354,000	XX	788,000
Total	XX	269,000	XX	447,000 ^r	XX	906,000

^rRevised. NA Not available. XX Not applicable.

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

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

TABLE 2
IDAHO: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	2004			2005		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone	8	404	\$2,680	6	504	\$3,560
Shell	1	W	W	1	W	W
Granite	10	462 ^r	2,540 ^r	10	692	3,280
Traprock	21 ^r	1,900 ^r	9,510 ^r	15	2,240	12,000
Quartzite	2	W	W	2	W	W
Miscellaneous stone	5 ^r	226 ^r	1,200 ^r	7	546	2,570
Total	XX	3,420 ^r	18,100 ^r	XX	4,450	23,900

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

¹Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 3
IDAHO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2005, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	12	73
Filter stone	W	W
Other coarse aggregate	23	139
Total	35	212
Coarse aggregate, graded:		
Bituminous aggregate, coarse	179	1,000
Bituminous surface-treatment aggregate	(2)	(2)
Railroad ballast	(2)	(2)
Total	252	1,450
Fine aggregate (-¾ inch):		
Stone sand, bituminous mix or seal	(2)	(2)
Screening, undesignated	(2)	(2)
Total	30	175
Coarse and fine aggregates:		
Graded road base or subbase	1,540	7,510
Unpaved road surfacing	45	176
Other coarse and fine aggregates	141	820
Total	1,730	8,510
Other construction materials	(3)	1
Agricultural:		
Agricultural limestone	(2)	(2)
Poultry grit and mineral food	(2)	(2)
Total	32	855
Chemical and metallurgical:		
Cement manufacture	(2)	(2)
Flux stone	(2)	(2)
Total	635	2,660
Special:		
Mine dusting or acid water treatment	(2)	(2)
Asphalt fillers or extenders	(2)	(2)
Other fillers or extenders	(2)	(2)
Total	3	51
Other miscellaneous uses, chemicals	(4)	(4)
Unspecified: ⁵		
Reported	1,280	7,530
Estimated	453	2,500
Total	1,740	10,000
Grand total	4,450	23,900

W Withheld to avoid disclosing company proprietary data; included with "Other coarse aggregate."

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Withheld to avoid disclosing company proprietary data; included in "Total."

³Less than ½ unit.

⁴Withheld to avoid disclosing company proprietary data; included in "Unspecified: Reported."

⁵Reported and estimated production without a breakdown by end use.

TABLE 4
IDAHO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2005,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	2,610	\$13,400	\$5.15
Plaster and gunite sands	32	182	5.62
Concrete products (blocks, bricks, pipe, decorative, etc.)	17	90	5.18
Asphaltic concrete aggregates and other bituminous mixtures	830	5,190	6.26
Road base and coverings ²	5,200	22,500	4.33
Fill	1,440	4,340	3.01
Snow and ice control	134	737	5.52
Railroad ballast	463	6,970	15.08
Other miscellaneous uses	166	750	4.51
Unspecified: ³			
Reported	3,060	11,500	3.75
Estimated	6,810	28,200	4.13
Total or average	20,800	93,800	4.52

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Includes road and other stabilization (cement).

³Reported and estimated production without a breakdown by end use.