

The Mineral Industry of Idaho—1980

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The Mineral Industry of Idaho



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BUREAU OF MINES

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The Mineral Industry of Idaho

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

By D. W. Lockard,¹ M. M. Miller,² and E. H. Bennett³

Idaho's nonfuel mineral production in 1980 rose to \$522 million from \$438 million in 1979. This increase continued the trend started in late 1976 when commodity production expanded, and the value of metallics—notably gold and silver—rose on world markets. For 1980, these price escalations more than offset the decline in unit production attributable to mining lower grade ores and to a major labor strike.

In terms of revenue, silver again was the leading commodity, followed by phosphate rock, lead, and zinc. Metallic minerals,

mostly from the Coeur d'Alene district, accounted for nearly 72% of the total mineral revenue for 1980. During the year, events were set in motion that should make Idaho a significant producer of cobalt and molybdenum.

Controversy over Federal regulations (air quality and land use classification) continued throughout the year. Late in 1980, the Governor began preparation of a new mineral severance tax proposal to be submitted to the 1981 Idaho Legislature.

Table 1.—Nonfuel mineral production in Idaho¹

Mineral	1979		1980	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Antimony ore and concentrate, antimony content	W	W	83	W
Clays	28	\$263	27	\$301
Copper (recoverable content of ores, etc.)	3,618	7,421	3,103	7,006
Gem stones	NA	60	NA	60
Gold (recoverable content of ores, etc.)	24,140	7,423	W	W
Lead (recoverable content of ores, etc.)	42,636	49,479	38,607	36,139
Phosphate rock	4,880	95,728	4,991	100,873
Sand and gravel ²	7,719	18,149	5,299	14,203
Silver (recoverable content of ores, etc.)	17,144	190,129	13,695	282,663
Stone ³	2,952	8,787	2,007	7,240
Zinc (recoverable content of ores, etc.)	29,660	24,391	27,722	22,876
Combined value of cement, garnet (abrasive), gypsum, lime, perlite, pumice, sand and gravel (industrial), stone (dimension), tungsten (1980), vanadium, and values indicated by symbol W	XX	36,055	XX	50,734
Total	XX	437,885	XX	522,095

NA Not available. W Withheld to avoid disclosing company proprietary data; value included in "Combined value" figure. XX Not applicable.

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

²Excludes industrial sand; value included in "Combined value" figure.

³Excludes dimension stone; value included in "Combined value" figure.

Table 2.—Value of nonfuel mineral production in Idaho, by county¹

(Thousands)

County	1978	1979	Minerals produced in 1979 in order of value
Ada	\$2,791	W	Sand and gravel, gold, silver, copper, lead.
Adams	W	W	Copper, stone, silver.
Bannock	W	W	Cement, sand and gravel, stone, gold, silver, lead, copper, zinc.
Bear Lake	772	W	Sand and gravel, stone, silver, lead, copper.
Benewah	W	W	Garnet, sand and gravel, clays, stone.
Bingham	W	W	Phosphate rock, sand and gravel, pumice.
Blaine	W	W	Lead, silver, gold, copper.
Boise	(²)	W	Stone, gold, silver, lead, copper, zinc.
Bonner	345	W	Sand and gravel, silver, lead, gold, zinc, copper.
Bonneville	2,712	\$3,258	Sand and gravel, pumice, stone.
Boundary	121	W	Sand and gravel, stone.
Butte	—	(²)	Silver, copper, lead.
Canyon	W	W	Sand and gravel, lime.
Caribou	81,352	98,104	Phosphate rock, vanadium, stone, sand and gravel.
Cassia	W	W	Sand and gravel, stone, silver, lead, gold, copper, zinc.
Clark	W	84	Sand and gravel, stone, clays.
Clearwater	466	430	Stone.
Custer	1,130	1,750	Silver, lead, zinc, stone, copper, gold.
Elmore	W	W	Sand and gravel, clays, gold, silver, lead, copper.
Franklin	158	174	Stone, sand and gravel.
Fremont	533	702	Do.
Gem	1,697	1,918	Sand and gravel, stone.
Gooding	W	W	Sand and gravel.
Idaho	—	W	Stone, sand and gravel.
Jerome	115	—	—
Kootenai	W	1,474	Sand and gravel, silver, gold, stone, copper, lead.
Latah	W	W	Stone, clays.
Lemhi	139	W	Lead, silver, sand and gravel, gypsum, gold, zinc, copper, stone.
Lewis	171	117	Stone.
Lincoln	148	3	Sand and gravel.
Madison	1,822	1,639	Do.
Minidoka	W	W	Lime, sand and gravel.
Nez Perce	1,342	W	Stone, sand and gravel, silver, lead, copper.
Oneida	W	W	Perlite, pumice.
Owyhee	W	W	Silver, gold.
Payette	130	130	Sand and gravel.
Power	350	44	Do.
Shoshone	W	W	Silver, lead, zinc, copper, gold, antimony.
Teton	40	—	—
Twin Falls	W	W	Sand and gravel, lime.
Valley	146	249	Sand and gravel, stone.
Washington	W	W	Gypsum, stone.
Undistributed ³	202,743	327,809	
Total	⁴ 299,227	437,885	

W Withheld to avoid disclosing company proprietary data; included with "Undistributed."

¹Camas and Jefferson Counties are not listed because no nonfuel mineral production was reported.²Less than 1/2 unit.³Includes some gem stones that cannot be assigned to specific counties and values indicated by symbol W.⁴Data do not add to total shown because of independent rounding.

Table 3.—Indicators of Idaho business activity

	1979	1980 ^P	Change, percent
Employment and labor force, annual average:			
Total civilian labor force	422.0	424.0	+ 0.5
Unemployment	24.0	33.0	+ 37.5
Employment (nonagricultural):			
Mining	4.3	4.6	+ 7.0
Manufacturing	58.3	54.9	- 5.8
Contract construction	19.1	16.7	- 12.6
Transportation and public utilities	20.5	20.4	- .5
Wholesale and retail trade	83.4	81.4	- 2.4
Finance, insurance, real estate	23.4	23.5	+ .4
Services	59.4	60.8	+ 2.4
Government	69.6	69.2	- .6
Total nonagricultural employment	338.0	331.5	- 1.9

See footnotes at end of table.

Table 3.—Indicators of Idaho business activity —Continued

	1979	1980 ^P	Change, percent
Personal income:			
Total ----- millions.	\$6,905	\$7,682	+11.2
Per capita -----	\$7,632	\$8,126	+6.5
Construction activity:			
Number of private and public residential units authorized -----	8,974	5,374	-40.1
Value of nonresidential construction ----- millions.	\$116.0	\$96.1	-17.2
Value of State road contract awards ----- do.	\$50.7	\$23.5	-53.6
Shipments of portland and masonry cement to and within the State ----- thousand short tons.	473	364	-23.0
Nonfuel mineral production value:			
Total crude mineral value ----- millions.	\$437.9	\$522.1	+19.2
Value per capita, resident population -----	\$484	\$553	+14.3
Value per square mile -----	\$5,241	\$6,248	+19.2

^PPreliminary.

Sources: U.S. Department of Commerce, U.S. Department of Labor, Highway and Heavy Construction Magazine, and U.S. Bureau of Mines.

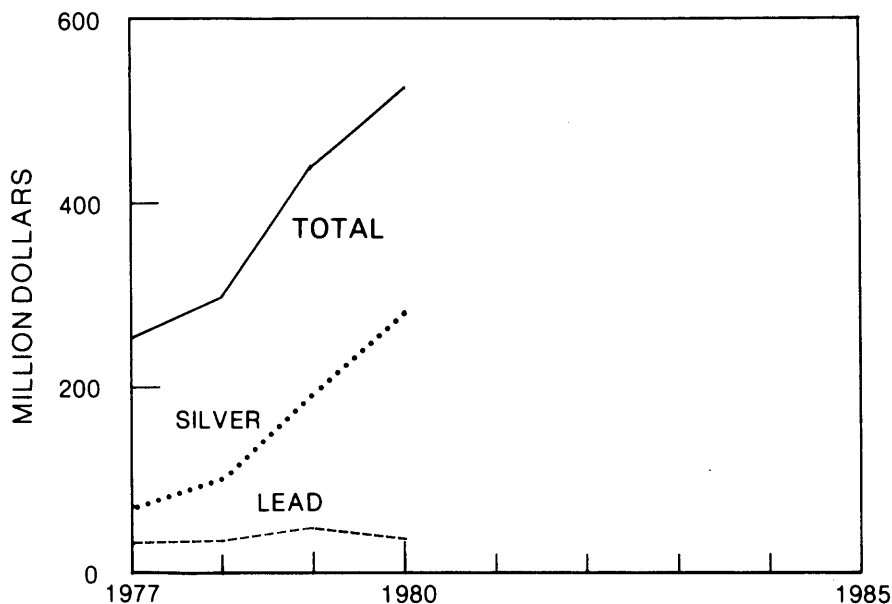


Figure 1.—Value of silver and lead, and total value of nonfuel mineral production in Idaho.

Trends and Developments.—Sometime during the past 2 years, the Coeur d'Alene mining district exceeded the total production of Potosí, Bolivia, to become the largest silver-producing district in the world. Total production from the Bolivian mines, discovered by the Spanish around 1514, is estimated to have been 875 to 900 million ounces, while the Coeur d'Alene district, discovered in 1884, has produced an estimated 936 million ounces. Total metal production value from the district, through 1980, is believed to be nearly \$4 billion.

Projected costs of new mineral projects started in the Coeur d'Alene district in 1980 exceed \$76 million. This includes sinking the Silver Shaft at Hecla's Lucky Friday Mine (\$27 million), sinking a new shaft at Callahan Mining Corp.'s Caladay Project (\$26 million), rehabilitating and reopening the Silver Summit Mine and Polaris mill by Consolidated Silver (\$12 million), sinking the new No. 12 shaft at the Sunshine Mine (\$4.5 million), and deepening the Crescent shaft (\$1.6 million). Capital costs of exploration agreements between Coeur d'Alene operators that were signed during the year are conservatively estimated to be worth \$4 million. Bunker Hill began expanding its electrolytic silver refinery (\$1.5 million), and Sunshine Mining Co. started construction on its silver refinery (\$6 million). The refinery will use a modified nitric-sulfuric acid pressure leach process that was developed by Sunshine and the U.S. Bureau of Mines.

The Bunker Hill Co. shut down its electrolytic zinc plant from late June to early August because the company could not obtain a sufficient supply of zinc concentrates; nearly 400 hourly employees were affected. Also, the company and employees signed a new 3-year labor contract in early fall. Early in the year, Placid Oil Co., a Hunt family subsidiary, made a \$500 million tender offer for Gulf Resources and Chemical, the Bunker Hill parent company; the offer was subsequently refused, although Placid Oil did acquire 11.34% of Gulf Resources. Legal problems surrounding the Bunker Hill smelter continued throughout the year, and at one point it was widely rumored that the smelter was for sale for \$150 million. In January, a Federal judge imposed a "gag order" on all parties involved in a lawsuit filed against the company by parents of Kellogg children because blood tests on the children showed high lead levels; the suit is for \$20 million. The

company denied smelter access to Environmental Protection Agency inspectors. The courts later ordered the company to allow the inspectors to proceed, pending an appeal. Because of legal and technical errors in safety inspections, the Occupational Safety and Health Administration (OSHA) dropped nearly \$35,000 in fines it had levied against Bunker Hill. Another list (84 pages) of violations was presented to the company by OSHA in September, and the company expects to appeal all or most of these; fines for the alleged violations could exceed \$82,000.

Production from the Sunshine Mine, normally the Nation's largest silver producer, declined significantly in 1980 because of an 8-1/2-month labor strike (March to November). The mine was run by supervisory personnel during this period. The strike slowed development on the No. 12 shaft. When operational, the shaft is expected to facilitate ore handling from the Sunshine Unit Area and enable the company to expand production to 6.5 million ounces in 1982 and eventually to 7.5 million ounces annually. In a unique capital raising venture, Sunshine issued \$30 million in silver-backed bonds that can be redeemed for cash or silver bullion. The bonds pay 8-1/2% annual interest, and face value may be redeemed at maturity for \$1,000 in cash or 50 ounces of silver, whichever is greater. Early in the year, Arab Investors S.A. purchased an additional 500,000 shares of Sunshine stock, bringing its total to 1.5 million shares for a 26% interest in the company.

Consolidated Silver Corp. announced approval of a joint lease venture between Hecla Mining Co., Coeur d'Alene Mines Corp., Silver Dollar Mining Co., and Sunshine Mining Co. to reopen the Silver Summit Mine, located between the Sunshine and Coeur Mines; Hecla Mining Co. is to be the property operator. The agreement covers extending the present shaft depth to 5,524 feet, 10,000 feet of drifting, and nearly 20,000 feet of exploration drilling; estimated project employment is 60.

Coeur d'Alene Mines Corp. continued exploration work on the CAMP Project (Coeur d'Alene Mines, Merger Mines, Plainview Mining) adjacent to the Coeur Mine. The company entered into an exploration program with Royal Apex Silver, Inc., on property it holds north of Osburn. The company's Coeur Mine, operated by ASARCO Incorporated, was the third leading silver

producer in the country during 1980.

Callahan Mining Corp. announced early in 1980 that it would undertake a major shaft sinking program on its Caladay property. Plans call for the shaft to be 5,100 feet deep; in June the shaft contract was let to Wallace Diamond Drilling Co. of Osburn. The structure will be a three-compartment timbered shaft, and sinking will take 4-1/2 years; it is planned to exploration drill and develop mining levels as shaft sinking proceeds.

Hecla's Lucky Friday and Star-Morning Mines operated at capacity during 1980. The company awarded a contract to J. S. Redpath Corp. to construct a new 7,700-foot shaft, called the Silver Shaft, at the Lucky Friday Mine. The shaft, 18 feet in diameter and concrete lined, will be the first circular shaft in the district. It is currently planned to reach the 5,500-foot level by late 1983, and production from the first mining level (5,300 feet) is scheduled by 1985. Production from the Lucky Friday should increase to 1,000 short tons per day at that time. This new access should allow increased production from Day's Hunter Ranch area and the DIA (Day Mines, Independence, and Abot) Project. Hecla was awarded \$424,000 in a legal dispute with the Bunker Hill Co. involving ore concentrate purchases from the Star-Morning Mine, of which Bunker Hill controls 70%.

Asarco, operator of the Galena and Coeur Mines, worked out an agreement between Coeur d'Alene Mines Corp. and American Silver Mining Co., whereby Asarco will undertake exploration and development work on American Silver's ground near the Coeur Mine. Exploration will start on the 3,400-foot level from the Coeur Mine and cost \$3 to \$4 million.

Diamond drilling and other exploration efforts were conducted by Newmont Exploration, Ltd., on ground controlled by Capital Silver Mines, Inc., north of Wallace.

Numerous small firms were quite active in the district, including Merger Mines, Beacon Light Mining Co., Magna Mining Co., and Silver Star Mines, Inc. Because of high precious metal prices during the year, exploration activities occurred throughout the district's 26-mile length.

High commodity prices also meant activity upswings in the remainder of the State. Two major events, one each in Custer and Lemhi Counties, gathered most of the attention. Cyprus Mines Corp., recently acquired by AMOCO Standard Oil Co. (Indiana),

announced plans for what will be the largest open pit mine in the State, the Thompson Creek Molybdenum Project in Custer County. A draft environmental impact statement on the project was released in early summer; public hearings were held, and a final statement was due in early 1981. Plans call for preproduction stripping and mill construction to begin in 1981, with mining to start in 1983. The open pit is projected to be 1 mile across and 1,600 feet deep at the high wall. With the ore body averaging 0.18% MoS₂, daily ore production is expected to reach 20,000 to 25,000 short tons for an annual yield of 17 to 20 million pounds of molybdenum. Anticipated mine life is 20 years. Cyprus estimates that nearly \$300 million will be invested in the mine, mill, tailings pond, and ancillary facilities. Employment should reach about 550 people by 1983, with an annual payroll approaching \$16 million. The total impact of this operation should raise the population of Custer County by nearly 40%.

In nearby Lemhi County, Noranda Mining Inc. announced the reopening of the Blackbird Mine, a past producer of cobalt and copper. The company began work on a draft environmental statement in September 1980. Noranda is spending in excess of \$1 million per month for exploration, mine rehabilitation, water treatment plant construction, and mill refurbishing. Preproduction costs are estimated in the range of \$150 to \$200 million. Ore grade averages 0.6% Co and 1.6% Cu on defined reserves of 4 million tons; expected mill capacity is 2,000 tons per day. Underground mining methods will be utilized, and eventually a new shaft may be sunk. At yearend, employment reached 165; this is expected to be 400 to 600 when full production is attained. A major part of Noranda's effort includes environmental problems associated with a large-scale operation close to a wilderness area (River of No Return Wilderness). In this respect, the company has completed a 400-gallon-per-minute water treatment facility (\$1 million). Other concerns involve a reclamation plan and tailing impoundment construction.

Earth Resources operated the Delamar open pit mine and mill at above design capacity for the year. At yearend, Earth Resources was merged into MAPCO, Inc., of Tulsa, Okla., through a stock tender offer; MAPCO subsequently announced the Delamar operation would be expanded in the near future. Increased metal prices extend-

ed reserves at the mine to more than 20 years. Other companies active in Owyhee County included Denison Mines and Freeport Minerals, who reportedly staked a large claim block north of the Delamar town site.

In Boise County, AMAX Inc. did more exploration drilling on its CUMO molybdenum prospect at Grimes Creek. Abella Resources did further evaluation on its Little Falls molybdenum prospect north and across the Payette River from the AMAX property. The Missouri Mine near Pioneer-ville was in operation during the year. Numerous small operators were probing in the Boise Basin area, an old gold mining region.

The Banner Mining Co., a joint venture between Silver Chief Mining Co. and National Resources, Ltd., of Dallas, Tex., continued development work on the Banner Mine outside of Idaho City. The company expended more than \$1 million on mine rehabilitation work and expects to ship ore in 1981.

Several areas in Custer County had increased mineral activities during the year. Small gold-silver lode and placer operations were very active. Myko, Inc., shipped ore from the Phi Kappa Mine to its mill at Mackay, and production of lead-silver ore was reported from the Greyhound Mine near Seafoam. Tungsten ore was stockpiled at the Tungsten Jim property on Thompson Creek. Denison Mines made plans to evaluate the Lost Packer Mine, a dormant copper producer near Loon Creek. The Anaconda Company helicoptered a large drill rig into the Pioneer-Tango Creek area in preparation of drilling a newly discovered molybdenum showing. U.S. Antimony Corp. operated a 100-ton-per-day gold mill on the Yankee Fork of the Salmon River; mill feed consisted of dump material from the Charles Dickens Mine. Further north, Sunbeam Mining Corp. constructed three test gold heap-leach pads and a building to house gold recovery equipment; the plant uses a zinc-cyanide extraction process. Inspiration Development Co. continued work in the Bayhorse mining district west of Challis. The company now holds a significant land position and controls the Bayhorse, Pacific, Ramshorn, and Keystone Mines in the area; commodities located include silver, lead, and fluorspar. Bear Creek Mining Co., a Kennecott Corp. subsidiary, evaluated and later dropped options on a tungsten property in the Wildhorse Creek

area north and west of Mackay.

Numerous exploration projects were underway in Lemhi County. Brenda Mines, Ltd., continued work on a molybdenum property on Spring Creek, near Shoup. Inspiration Development Co. continued feasibility studies on the Ima Mine, a dormant tungsten producer near Patterson, and further evaluated the Salmon River Copper Mine. COMINCO Ltd. drilled several holes on its recent molybdenum discoveries at Napoleon Ridge, north of Salmon. Cal-Ida Mines reportedly drilled a copper prospect on McDivett Creek, southeast of Salmon.

Canadian Superior Mining (U.S.) Ltd. did no further testing of its proposed gold heap leaching operation at Stibnite, Valley County. Work progressed by the U.S. Forest Service and an independent consultant on the draft environmental impact statement, which should be released in early 1981. The Golden Reef Joint Venture recovered gold from its operation at the Dewey Mine, about 20 miles east of Stibnite.

After being closed for a short time by the State for failure to submit an adequate reclamation plan, Silver King Mines continued operations at its Copper Cliffs Mine and mill at Cuprum, Adams County. The mill also processed ore from Texasgulf's Iron Dyke Mine in Oregon. Numerous claims were made in the press concerning Anglo-Bomarc Ltd.'s Hercules property near Cambridge. Media reports stated that this would be the largest open pit silver mine in the world. Anglo-Bomarc did complete an agreement with TRV Minerals, Inc. (Twin Rivers Development), which anticipates spending \$1 million on the property this year, with \$4 million to be spent during the next few years. This would give TRV a 51% share of the property.

In the Panhandle (northern counties), operators were pursuing good precious and base-metal target areas. Shipments from the Silver Strand Mine were made to Asarco's Tacoma smelter before the copper workers' strike; ore was then stockpiled for future shipping. Shoshone Silver Mining Co. milled 600 short tons of ore from an open pit at the Weber and Keep Cool Mines. Painted Desert and Uranium Co. announced it had entered into an agreement with Union Carbide Corp. concerning the Elk Mountain tungsten property near Coeur d'Alene.

In the nonmetallic sector, J. R. Simplot Co. announced it was making plans to develop its new Smokey Canyon Mine, a 2-

million-ton-per-year phosphate operation in Caribou County. Construction at the mine site is set for 1982, with production scheduled for 1984; identified reserves are expected to last 30 years. A unique feature will be the use of a 25-mile slurry pipeline from the mine to the plant at Conda. Work is well underway on the draft environmental statement.

Oneida Perlite Co. is building a new filler plant and plans to install five new furnaces for producing expanded perlite for the ceramic insulation market. It is also entering the precast panel construction business for building industrial firewall panels.

NL Baroid, a division of NL Industries Inc., plans to build a barite processing plant that should be completed by 1985 in the Hailey area of Blaine County; the barite will come from the Old Soldier and Bonnie May Claims. Cash Industries of Ketchum, operated a 100-ton-per-day barite processing mill on Warm Springs Creek. The company plans to start underground mining next year and has 5 to 7 years of reserves blocked out.

Industrial minerals used in the construction industry suffered through a declining year. Demand slackened and resulted in a fallback of production.

Legislation and Government Programs.—A bill creating the "River of No Return Wilderness" was approved by Congress and signed by President Carter during the year. The law created a 2.2-million-acre wilderness in the central part of the State, and was unique in that it set up a special mineral management zone. This zone, containing 39,000 acres, will be managed as wilderness; however, it has a high potential to contain significant strategic mineral deposits (cobalt) and will be further evaluated by the Department of Defense. If minable deposits of the metal are located, they can be extracted without special restrictions. In August, Noranda Exploration Co. staked numerous claims in this special management zone.

Out of a total of 11.9 million acres in Idaho, the Bureau of Land Management identified 1.6 million acres in 61 separate units for wilderness study areas. Special regulations have been drafted for mineral operations in these areas.

U.S. Department of the Interior mineral resource agencies were involved in mineral appraisal studies in the State. The U.S. Geological Survey worked in the Ten Mile area, while the Bureau of Mines worked in the Selway-Bitterroot Wilderness area.

The 45th Idaho Legislature, second regular session, met for 3 months and dealt with several bills that would affect the State's mineral industry. Many of the measures dealt with prohibiting dredge mining. One bill, to provide for enforcement of certain provisions of the Stream Channel Protection Act, was enacted. Bills raising the bond requirements for both surface and dredge mining were signed into law. A key bill to allow the prepayment of property tax for new businesses was also enacted. This bill was specifically intended to enable Cyprus Mines Corp. to prepay taxes to Custer County to help alleviate the impact of increased employment in regard to the Thompson Creek Molybdenum Project.

The Idaho Bureau of Mines and Geology (IBMG) continued to be active in delineating the State's geological and mineral resources. A new 1:250,000-scale map series was started during the year. These maps, prepared under a cooperative agreement with the U.S. Geological Survey, U.S. Bureau of Mines, U.S. Forest Service, and U.S. Bureau of Land Management, are designed to show all mines and prospects in the State; the first 10 maps are scheduled for release in 1981. Geologists continued field mapping and geological reconnaissance in Custer and Owyhee Counties; mapping also continued in Washington and Adams Counties. A program, in cooperation with the U.S. Geological Survey, to evaluate the phosphate resources in southeastern Idaho progressed with completion of the Upper Valley 7.5-minute quadrangle map. A publication is soon to be released covering a bibliography of papers relating to the Phosphoria Formation. IBMG noted a healthy rise in publication sales, nearly one-third more than those in 1979.

The Mining and Mineral Resources and Research Institute at the University of Idaho received \$49,656 in new and continuing research grants, in addition to its annual allotment grant of \$110,000. The money is to cover research in the extractive metallurgy and environmental research areas.

Employment.—At yearend, 4,600 people were employed directly in mining, an increase of nearly 7% from that reported at the end of 1979. The reported increase in metal mining for the same period was almost 10%. Total mineral industry employment in the State reached an estimated 12,500 at the end of 1980, including the approximately 700 construction workers at Cyprus's Thompson Creek Molybdenum Project.

REVIEW BY NONFUEL MINERAL COMMODITIES

METALS

Antimony.—Production dropped significantly in 1980 because of a labor strike at the Sunshine Mine, the State's sole producer. Reported production was only 20% of that for 1979; value was reduced a corresponding amount.

Cobalt.—There was no recorded production for 1980. Noranda Mining Inc. continued development work at its Blackbird Mine, Lemhi County, and nearly completed refurbishing the concentrator.

Copper.—In 1980, copper was produced

from 12 mines in the State. Nearly 88% of the State total came from eight mines in the Coeur d'Alene district. Asarco's Coeur Mine was the largest producer, followed by the Galena Mine, and Hecla's Lucky Friday; only the Coeur and Galena produced more than 1 million pounds. The Copper Cliff Mine in Adams County, operated by Silver King Mines, Inc., was the only significant producer outside the Coeur d'Alenes. For the year, Idaho ranked ninth in the Nation. No large copper exploration program was reported in Idaho in 1980.

Table 4.—Idaho: Mine production (recoverable) of gold, silver, copper, lead, and zinc, by county

County	Lode mines producing	Material sold or treated (metric tons)	Gold		Silver	
			Troy ounces	Value	Troy ounces	Value
1978, total	26	2,171,546	20,492	\$3,966,229	18,379,417	\$99,248,848
1979, total	34	2,121,412	24,140	7,423,057	17,144,209	190,129,279
1980:						
Blaine	2	42	W	W	214	4,417
Boise	1	417	W	W	335	6,914
Kootenai	1	559	W	W	4,623	95,419
Lemhi	1	1,063	W	W	16,863	348,052
Nez Perce	1	147	—	—	2,273	46,915
Shoshone	9	1,405,856	2,639	1,616,546	12,021,191	248,117,382
Undistributed ¹	6	790,471	W	W	1,649,403	34,043,677
Total	21	2,198,556	W	W	13,694,902	282,662,776
Copper						
	Metric tons	Value	Metric tons	Value	Metric tons	Value
1978, total	3,888	\$5,700,750	44,761	\$33,255,690	32,353	\$22,110,812
1979, total	3,618	7,420,583	42,636	49,479,186	29,660	24,390,724
1980:						
Blaine	—	—	1	1,382	—	W
Boise	—	—	1	1,174	—	W
Kootenai	(³)	(³)	1	893	—	126,117
Lemhi	(³)	(³)	212	198,118	—	652,222
Nez Perce	(³)	(³)	5	4,445	—	51,360
Shoshone	2,729	6,160,892	38,140	35,702,229	27,677	22,838,447
Undistributed ¹	374	844,874	247	231,009	46	37,817
Total	3,103	7,005,766	38,607	36,139,250	227,722	22,876,264
Zinc						
	Metric tons	Value	Metric tons	Value	Metric tons	Value
1978, total	3,888	\$5,700,750	44,761	\$33,255,690	32,353	\$22,110,812
1979, total	3,618	7,420,583	42,636	49,479,186	29,660	24,390,724
1980:						
Blaine	—	—	1	1,382	—	W
Boise	—	—	1	1,174	—	W
Kootenai	(³)	(³)	1	893	—	126,117
Lemhi	(³)	(³)	212	198,118	—	652,222
Nez Perce	(³)	(³)	5	4,445	—	51,360
Shoshone	2,729	6,160,892	38,140	35,702,229	27,677	22,838,447
Undistributed ¹	374	844,874	247	231,009	46	37,817
Total	3,103	7,005,766	38,607	36,139,250	227,722	22,876,264

W Withheld to avoid disclosing company proprietary data.

¹Includes Adams, Custer, and Owyhee Counties combined to avoid disclosing company proprietary data.

²Data do not add to total shown because of independent rounding.

³Included in "Undistributed" in order to avoid disclosing company proprietary data.

Table 5.—Idaho: Mine production (recoverable) of gold, silver, copper, lead, and zinc in 1980, by class of ore or other source material

Source	Number of mines	Material sold or treated (thousand metric tons)	Gold (troy ounces)	Silver (thousand troy ounces)	Copper (metric tons)	Lead (metric tons)	Zinc (metric tons)
Lode ore:							
Dry gold, gold-silver, and silver ¹ -----	12	1,396,379	W	12,086	2,484	13,584	1,607
Copper, lead, lead-zinc, and zinc ¹ -----	9	802,177	W	1,609	618	25,023	26,115
Total lode material	21	2,198,556	W	13,695	² 3,103	38,607	27,722

W Withheld to avoid disclosing company proprietary data.

¹Combined to avoid disclosing company proprietary data.²Data do not add to total shown because of independent rounding.**Table 6.—Idaho: Mine production (recoverable) of gold, silver, copper, lead, and zinc in 1980, by type of material processed and method of recovery**

Type of material processed and method of recovery	Gold (troy ounces)	Silver (thousand troy ounces)	Copper (metric tons)	Lead (metric tons)	Zinc (metric tons)
Lode ore:					
Cyanidation and direct smelting of ore ¹ -----	W	1,573	6	225	---
Smelting of concentrates -----	2,692	12,122	3,096	38,382	27,722
Total -----	W	13,695	² 3,103	38,607	27,722

W Withheld to avoid disclosing company proprietary data.

¹Combined to avoid disclosing company proprietary data.²Data do not add to total shown because of independent rounding.

Gold.—Idaho ranked seventh in the Nation in gold production in 1980. The value of production was more than double that of the previous year. MAPCO Inc.'s Delamar Mine, formerly owned by Earth Resources Co., and Hecla's Lucky Friday Mine were the State's leading producers. MAPCO announced at yearend that plans would be made to expand production at the Delamar Mine. Coeur d'Alene district gold production remained constant when compared with that of previous years.

Iron ore.—There was no reported production of iron ore in the State for 1980.

Lead.—Idaho ranked second in the Nation in 1980 in lead production, accounting for almost 7% of the newly mined total. Production and value both decreased when compared with those of 1979, primarily because of decreased lead output at the Lucky Friday Mine. Lead was produced at 16 mines, with 9 mines in the Coeur d'Alene district accounting for 99% of the State's total production; the Hilltop Mine (Lemhi County) and the Clayton Mine (Custer County) accounted for most of the remainder. The Bunker Hill Mine was the larg-

est lead producer, followed closely by Hecla's Lucky Friday and Star Mines.

Molybdenum.—There was no recorded production in the State for 1980. This is expected to change in the near future when Cyprus Mines' Thompson Creek Mine comes onstream. Also, Inspiration Development Co. may produce molybdenum concentrates from the Ima Mine in Lemhi County by 1982.

Silver.—Although silver production decreased 25% when compared with that reported in 1979, Idaho still was the leading producing State in 1980, accounting for nearly 44% of the newly mined metal. Primary reasons for the decrease were the shutdown at the Sunshine Mine, resulting from a labor contract expiration, and the mining of lower grade ores. During 1980, only at Asarco's Coeur Mine, Hecla's Lucky Friday Mine, and MAPCO's Delamar Mine did silver production exceed that reported in 1979. Ranked nationally, Idaho's mines held 4 of the top 10 positions in silver production. The Galena was the Nation's top silver producer, followed by the Lucky Friday and the Coeur; the Delamar (Owy-

hee County) was ranked sixth. Four Idaho mines were in the second 10, led by the Sunshine Mine, which was 12th.

Although production decreased, rapid price fluctuations during the year caused silver revenues to reach an alltime high, up 49% more than reported in 1979.

Tungsten.—Tungsten production was reported from a small operator in Valley County; no production was reported in the State in 1979. Inspiration Development Co. continued to delineate tungsten resources at the inactive Ima Mine in Lemhi County.

Vanadium.—Production and value of vanadium pentoxide slipped slightly below the figures reported in 1979. Kerr-McGee Corp. was the sole producer from its plant at Soda Springs, Caribou County; the vanadium was recovered from ferrophosphorous slag. Idaho ranked third in the Nation in 1980 in vanadium output from domestic ores.

Zinc.—Idaho ranked fifth nationally in production of newly mined zinc during 1980. Output for the year was down slightly as a result of lower zinc production from Hecla's Star Mine. Production was from eight mines; of these, six in the Coeur d'Alene district recorded nearly 99% of total output. The Bunker Hill Mine was the State's largest producer, followed by the Star Mine. The Clayton Mine and the Phi Kappa Mine, both in Custer County, were the other two producers.

NONMETALS

Abrasives (Natural).—Production came from one operator with two properties in Benewah County. Output was nearly 77% more than that reported in 1979; value was almost doubled.

Barite.—There was no reported production of barite in Idaho in 1980. However, it was known that deposits in Custer and Blaine Counties were being worked during the year.

Cement.—Output of cement from Oregon Portland Cement Co.'s plant at Inkom, Bannock County, continued throughout the year.

Clays.—Output for 1980 remained nearly level with that reported in 1979, while values received rose slightly. Interpace Corp. was the State's largest producer of common clay from various pits, mostly in Benewah County; the company accounted for more than 50% of the State's total output. United States Gypsum Co.'s lease in Latah County was the largest producer of fire clay. Other production was reported

from Clark and Elmore Counties.

Gem Stones.—Jasperoids and fire opals (Owyhee County), star garnets (Benewah County), and opals (Clark County) were recovered and sold within the State in 1980.

Gypsum.—Output for the year nearly doubled that reported in 1979. There were two producers, one each in Lemhi and Washington Counties. There was no reported calcined gypsum produced in the State during the year.

Lime.—All lime production was consumed in the State's agricultural industry (sugar beet processing). Output and value both rose for 1980 when compared with that reported in 1979 by 28% and 36%, respectively. Production occurred in Canyon, Minidoka, and Twin Falls Counties. Amalgamated Sugar Co. was the State's leading lime producer.

Perlite.—Oneida Perlite Co. in Oneida County continued to be the State's only producer of crude and expanded perlite. Output and value both increased in 1980 when compared with that reported in 1979. End uses of the expanded material were primarily for insulation and horticultural aggregates.

Phosphate Rock.—Idaho's production ranked second in the Nation for 1980. Total marketable production increased only slightly for the year when compared with that produced in 1979. Five companies produced from six mines. J. R. Simplot Co. was the State's largest producer, with production from the Gay and Conda Mines.

Public hearings were held on the proposed Smokey Canyon Mine being developed by J. R. Simplot Co. The mine is scheduled for operation in 1984 with a production rate of 2 million tons of phosphate rock per year; capital costs are estimated at \$20 million.

Pumice and Volcanic Cinders.—Both output and value of pumice production rose in 1980 from that reported in 1979. Output increased 11%, while value received increased more than 40%. In 1980, there were three producers operating from three quarries; Producer's Pumice was the largest from its pit in Bonneville County. All the material produced was used in lightweight concrete aggregate.

Sand and Gravel.—Construction sand and gravel output fell below the 1979 reported level, although value per ton produced rose. The production dropoff can be attributed to decreased activity in the construction industry throughout the State. MONROC Inc. was the leading producer, utilizing operations in six different coun-

ties; other notable producers included Strang Sand and Gravel and R & T Construction. Production from Ada and Canyon Counties exceeded 1 million tons.

Martin Marietta Aggregate was the State's only producer of industrial sand from a deposit in Gem County. Output fell below that reported in 1979.

Table 7.—Idaho: Construction sand and gravel sold or used, by major use category

Use	1979			1980		
	Quantity (thousand short tons)	Value (thou- sands)	Value per ton	Quantity (thousand short tons)	Value (thou- sands)	Value per ton
Concrete aggregate	2,402	\$6,255	\$2.60	2,194	\$6,543	\$2.98
Plaster and gunita sands	21	W	W	16	71	4.44
Concrete products	180	479	2.66	359	807	2.25
Asphaltic concrete	755	2,246	2.98	419	1,375	3.28
Roadbase and coverings	¹ 3,491	7,476	2.14	1,963	4,602	2.34
Fill	579	941	1.62	301	706	2.35
Snow and ice control	W	49	W	29	37	1.28
Railroad ballast	183	429	2.35	--	--	--
Other	109	274	² 2.51	19	61	3.21
Total ¹ or average	7,719	18,149	2.35	5,299	14,203	2.68

¹Revised. W Withheld to avoid disclosing company proprietary data; included in "Other."

²Data may not add to totals shown because of independent rounding.

Table 8.—Idaho: Sand and gravel sold or used by producers, by use

Use	1979			1980		
	Quantity (thousand short tons)	Value (thou- sands)	Value per ton	Quantity (thousand short tons)	Value (thou- sands)	Value per ton
Construction:						
Sand	2,029	\$4,931	\$2.43	1,690	\$4,745	\$2.81
Gravel	5,690	13,218	2.32	3,609	9,458	2.62
Total or average	7,719	18,149	2.35	5,299	14,203	2.68
Industrial sand	W	W	W	W	W	14.22
Grand total or average	W	W	W	W	W	2.95

W Withheld to avoid disclosing company proprietary data.

Stone.—Stone output came from 46 quarries in 20 counties. The decrease in output from 1979 was the result of operating 18 fewer quarries in 1980 because of the decrease in demand. The U.S. Forest Service produced 24% of the total stone output for

1980.

¹State mineral specialist, Bureau of Mines, Spokane, Wash.

²Director, Idaho Bureau of Mines and Geology, Moscow, Idaho.

³Associate director, Idaho Bureau of Mines and Geology, Moscow, Idaho.

Table 9.—Idaho: Crushed stone¹ sold or used by producers, by use

(Thousand short tons and thousand dollars)

Use	1979		1980	
	Quantity	Value	Quantity	Value
Agricultural limestone	—	—	29	86
Poultry grit and mineral food	5	15	5	16
Dense-graded roadbase stone	122	324	41	123
Surface treatment aggregate	795	1,593	365	1,062
Other construction aggregate and roadstone	844	2,230	408	1,050
Riprap and jetty stone	369	796	419	1,673
Railroad ballast	—	—	55	104
Chemicals	31	93	—	—
Paper manufacture	50	117	17	45
Other ²	736	3,620	668	3,082
Total ³	2,952	8,787	2,007	7,240

¹Includes limestone, granite, sandstone, traprock, and miscellaneous stone (1980).²Includes bituminous aggregate, cement manufacture, flux stone, roofing granules, and other uses.³Data may not add to totals shown because of independent rounding.**Table 10.—Principal producers**

Commodity and company	Address	Type of activity	County
Abrasives:			
Emerald Creek Garnet Milling Co	Box 176 Fernwood, ID 83830	Placer mine	Benewah.
Idaho Garnet Abrasive Co	Box 1080 Kellogg, ID 83837	Placer mine and plant.	Do.
Antimony: Sunshine Mining Co	Box 1080 Kellogg, ID 83837	Mine, mill, plant	Shoshone.
Cement: Idaho Portland Cement Co	Old National Bank, Rm 622 Inkom, ID 83245	Surface mine and plant.	Bannock.
Clays:			
A. P. Green Refractories (U.S. Gypsum)	Box 158 Troy, ID 83871	— do —	Latah.
Interpace Corp	Box 785 Ione, CA 95640	Surface mine	Benewah.
J. R. Simplot Co	Box 912 Pocatello, ID 83201	— do —	Latah.
Copper:			
ASARCO Incorporated	Box 440 Wallace, ID 83873	Mine and mill	Shoshone.
The Bunker Hill Co	Box 29 Kellogg, ID 83837	Mine, mill, plant	Do.
Hecla Mining Co	Box 320 Wallace, ID 83873	— do —	Do.
Silver King Mines Inc	1204 Deseret Bldg. Salt Lake City, UT 84111	Surface mine and mill.	Adams.
Sunshine Mining Co	Box 1080 Kellogg, ID 83837	Mine and mill.	Shoshone.
Gold:			
Hecla Mining Co	Box 320 Wallace, ID 83873	— do —	Shoshone.
MAPCO Inc	Box 52 Jordan Valley, OR 97910	Surface mine and mill.	Owyhee.
Gypsum:			
Consumers Coop Association	502 Pioneer Rd. Weiser, ID 83672	Surface mine	Washington.
E. J. Wilson & Sons	Dubois, ID 83423	— do —	Lemhi.
Lead:			
ASARCO Incorporated	Box 440 Wallace, ID 83873	Mine and mill	Shoshone.
The Bunker Hill Co	Box 29 Kellogg, ID 83837	Mine, mill, plant	Do.
Clayton Silver Mines	Box 890 Wallace, ID 83873	Mine and mill	Custer.
Hecla Mining Co	Box 320 Wallace, ID 83873	— do —	Shoshone.
Lime: Amalgamated Sugar Co	First Security Bank Bldg. Ogden, UT 84402	Plant	Various.
Perlite: Oneida Perlite Corp	Box 162 Malad City, ID 83552	Surface mine and plant.	Oneida.
Phosphate rock:			
Conda Partnership	Box 37 Conda, ID 83230	— do —	Caribou.
J. R. Simplot Co	Box 912 Pocatello, ID 83201	— do —	Various.
Monsanto Co	800 North Lindbergh St. Louis, MO 63166	Surface mine	Caribou.
Stauffer Chemical	Star Route Randolph, UT 84064	— do —	Do.

Table 10.—Principal producers —Continued

Commodity and company	Address	Type of activity	County
Pumice:			
Amcor, Inc. -----	Box 1141	Quarry -----	Bonneville.
Hess Pumice Products -----	Idaho Falls, ID 83401	-----do-----	Oneida.
Producers Pumice -----	Box 209	-----do-----	Bonneville.
	Malad City, ID 83252		
	6001 Fairview Ave.		
	Boise, ID 83704		
Sand and gravel:			
Bonneville County Engineer -----	Idaho Falls, ID 83401 -----	Pits -----	Do.
MONROC Inc. -----	Box 1221	-----do-----	Various.
	Idaho Falls, ID 83401		
R & T Construction -----	9755 Highway 55	Pit -----	Ada.
Strang Sand and Gravel -----	Boise, ID 83703	Pit -----	Canyon.
	6703 East Flamingo		
	Nampa, ID 83651		
Silver:			
ASARCO Incorporated -----	Box 440	Mine and mill. --	Shoshone.
The Bunker Hill Co. -----	Wallace, ID 83873	Mine, mill, plant --	Do.
	Box 29		
Clayton Silver Mines -----	Kellogg, ID 83837	-----do-----	Custer.
Hecla Mining Co. -----	Box 890	Mine and mill. --	Shoshone.
	Wallace, ID 83873		
MAPCO Inc. -----	Box 320	Surface mine and	Owyhee.
	Box 52	mill.	
Silver King Mines Inc. -----	Jordan Valley, OR 97910	-----do-----	Adams.
Sunshine Mining Co. -----	1204 Deseret Bldg.	Mine and mill. --	Shoshone.
	Salt Lake City, UT 84111		
	Box 1080		
	Kellogg, ID 83837		
Stone:			
FMC Corp. -----	1356 North Main	Quarry -----	Bannock.
Idaho Portland Cement Co. -----	Pocatello, ID 83201	Quarry and plant	Do.
	Old National Bank, Rm. 622		
Monsanto Co. -----	Inkom, ID 83245	Quarry -----	Caribou.
U.S. Forest Service, Region 4. -----	800 North Lindbergh Blvd.	-----do-----	Various.
	St. Louis, MO 63166		
	U.S. Federal Bldg.		
	Ogden, UT 84403		
Vanadium: Kerr-McGee Corp. -----	Box 478	Plant -----	Caribou.
	Soda Springs, ID 83276		
Zinc:			
The Bunker Hill Co. -----	Box 29	Mine, mill, plant --	Shoshone.
Clayton Silver Mines -----	Kellogg, ID 83837	Mine and mill. --	Custer.
Hecla Mining Co. -----	Box 890	-----do-----	Shoshone.
	Wallace, ID 83873		
	Box 320		
	Wallace, ID 83873		