The Mineral Industry of Idaho–1978-79

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The Mineral Industry of Idaho

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UNITED STATES DEPARTMENT OF THE INTERIOR • James G. Watt, Secretary

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] and E. H. Bennett[2]

The value of Idaho's nonfuel mineral production for 1978 was $299 million, and for 1979 it was $438 million. This dramatic increase in production values during the past 2 years was the result of rising metal prices, primarily gold and silver, and the lack of significant labor problems in the entire mineral sector. A 24-day strike at Hecla Mining Co.'s Lucky Friday Mine in 1978 was the only shutdown stemming from a labor-management controversy.

Silver was the leading metallic mineral commodity in terms of revenue; it was followed, in descending order, by values of phosphate rock, lead, and zinc. Metallic minerals accounted for nearly 70% of total mineral revenues in both 1978 and 1979.

Higher mineral prices prevailed throughout 1978 and into 1979, with dramatic increases shown in the latter half of the year. Of special importance were increased values of silver and gold with lesser increases in base metals (copper, lead, and zinc). Precious metals demand is expected to continue through 1980; it should favorably affect mining in the State since Idaho produces approximately 50% of the Nation's newly mined silver.

Although governmental regulations had a dampening effect on the State's mineral industry, increased metal prices and strengthening markets were positive through 1978-79. Federal land-use classifications continued to affect exploration in several areas throughout the State.

Table 1.—Nonfuel mineral production in Idaho[1]

Mineral	1977		1978		1979	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Antimony ore and concentrate, antimony content ---short tons	446	W	W	W	W	W
Clays ---thousand short tons	W	W	27	$148	28	$263
Copper (recoverable content of ores, etc.) ---metric tons	3,676	$5,413	3,888	5,701	3,618	7,421
Gem stones	NA	100	NA	50	NA	60
Gold (recoverable content of ores, etc.) ---troy ounces	12,894	1,912	20,492	3,966	24,140	7,423
Lead (recoverable content of ores, etc.) ---metric tons	42,872	29,016	44,761	33,256	42,636	49,479
Phosphate rock ---thousand metric tons	W	W	4,461	80,765	4,880	95,728
Sand and gravel ---thousand short tons	[2]7,750	[2]15,282	8,112	19,290	[2]7,719	[2]18,149

See footnotes at end of table.

Table 1.—Nonfuel mineral production in Idaho[1] —Continued

Mineral	1977 Quantity	1977 Value (thousands)	1978 Quantity	1978 Value (thousands)	1979 Quantity	1979 Value (thousands)
Silver (recoverable content of ores, etc.) thousand troy ounces	15,292	$70,649	18,379	$99,249	17,144	$190,129
Stone[3] thousand short tons	3,077	8,005	2,624	6,670	2,952	8,787
Zinc (recoverable content of ores, etc.) metric tons	28,121	21,327	32,353	22,111	29,660	24,391
Combined value of barite (1977-78), cement, garnet (abrasives), gypsum, lime, perlite, pumice, sand and gravel (industrial, 1977-78), stone (dimension), tungsten ore (1977), vanadium, and values indicated by symbol W	XX	100,966	XX	28,021	XX	36,055
Total	XX	252,670	XX	299,227	XX	437,885

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

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

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

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

Table 2.—Value of nonfuel mineral production in Idaho, by county[1]

(Thousands)

County	1977	1978	Minerals produced in 1978 in order of value
Ada	$2,269	$2,791	Sand and gravel.
Adams	1,898	W	Copper, stone, silver, sand and gravel.
Bannock	W	W	Cement, stone, sand and gravel.
Bear Lake	780	772	Sand and gravel, stone.
Benewah	W	W	Garnet, sand and gravel, clays, stone.
Bingham	W	W	Phosphate rock, sand and gravel.
Blaine	W	W	Barite, gold, silver.
Boise	(2)	(2)	Stone.
Bonner	W	345	Sand and gravel, stone.
Bonneville	W	2,712	Sand and gravel, lime, pumice, stone.
Boundary	W	121	Stone, sand and gravel.
Canyon	W	W	Sand and gravel, lime.
Caribou	70,768	81,352	Phosphate rock, vanadium, stone, sand and gravel.
Cassia	W	W	Sand and gravel, stone.
Clark	W	W	Do.
Clearwater	412	466	Stone.
Custer	W	1,130	Silver, lead, zinc, sand and gravel, stone.
Elmore	W	W	Sand and gravel, stone, clays, gold, silver.
Franklin	142	158	Stone, sand and gravel.
Fremont	533	533	Stone.
Gem	W	1,697	Sand and gravel, stone.
Gooding	508	W	Sand and gravel.
Idaho	1,021	W	Stone, sand and gravel.
Jefferson	422	--	
Jerome	166	115	Sand and gravel.
Kootenai	W	W	Sand and gravel, stone, silver, gold, copper, lead, zinc.
Latah	W	W	Stone, clays.
Lemhi	W	139	Stone, sand and gravel, gold, gypsum, zinc, copper, lead, silver.
Lewis	125	171	Stone.
Lincoln	W	148	Sand and gravel.
Madison	827	1,822	Do.
Minidoka	W	W	Lime, sand and gravel.
Nez Perce	W	1,342	Stone, sand and gravel.
Oneida	W	W	Perlite, pumice, stone.
Owyhee	W	W	Silver, gold, lead, zinc.
Payette	308	130	Sand and gravel.
Power	W	350	Stone, sand and gravel.
Shoshone	W	W	Silver, lead, zinc, copper, antimony, gold, stone.
Teton	287	40	Sand and gravel.
Twin Falls	W	W	Sand and gravel, lime.
Valley	W	146	Stone, sand and gravel.
Washington	W	W	Sand and gravel, gypsum, stone.

See footnotes at end of table.

Table 2.—Value of nonfuel mineral production in Idaho, by county[1] —Continued

(Thousands)

County	1977	1978	Minerals produced in 1978 in order of value
Undistributed[3]	$172,198	$202,743	
Total[4]	252,670	299,227	

W Withheld to avoid disclosing company proprietary data; included with "Undistributed."
[1]Butte and Camas Counties are not listed because no nonfuel mineral production was reported.
[2]Less than 1/2 unit.
[3]Includes stone that cannot be assigned to specific counties (1977), gem stones, and values indicated by symbol W.
[4]Data may not add to totals shown because of independent rounding.

Table 3.—Indicators of Idaho business activity

	1977	1978	1979[p]	1978-79 percent change
Employment and labor force, annual average:				
Total civilian labor force—thousands	389.0	407.0	422.0	+3.7
Unemployment—do	23.0	23.0	24.0	+4.3
Employment (nonagricultural):				
Mining—do	3.4	3.9	4.1	+5.1
Manufacturing—do	54.1	58.1	58.6	+.9
Contract construction—do	19.0	19.8	18.6	-6.1
Transportation and public utilities—do	18.0	19.5	20.2	+3.6
Wholesale and retail trade—do	76.8	82.1	83.4	+1.6
Finance, insurance, real estate—do	16.4	20.8	22.9	+10.1
Services—do	52.4	57.1	59.9	+4.9
Government—do	67.3	69.8	69.5	-.4
Total nonagricultural employment—do	307.4	[1]331.3	337.2	+1.8
Personal income:				
Total—millions	$5,301	$6,207	$6,739	+8.6
Per capita	$6,193	$7,074	$7,446	+5.3
Construction activity:				
Number of private and public residential units authorized	12,722	[2]10,468	8,485	-18.9
Value of nonresidential construction—millions	$106.3	$117.5	$116.0	-1.3
Value of State road contract awards—do	$50.0	$40.0	$50.7	+26.7
Shipments of portland and masonry cement to and within the State—thousand short tons	512	461	473	+2.6
Nonfuel mineral production value:				
Total crude mineral value—millions	$252.7	$299.2	$437.9	+46.4
Value per capita, resident population	$295	$341	$484	+41.9
Value per square mile	$3,024	$3,581	$5,241	+46.4

[p]Preliminary.
[1]Data do not add to total shown because of independent rounding.
[2]Series revised in 1978; data not comparable with those of prior years.

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

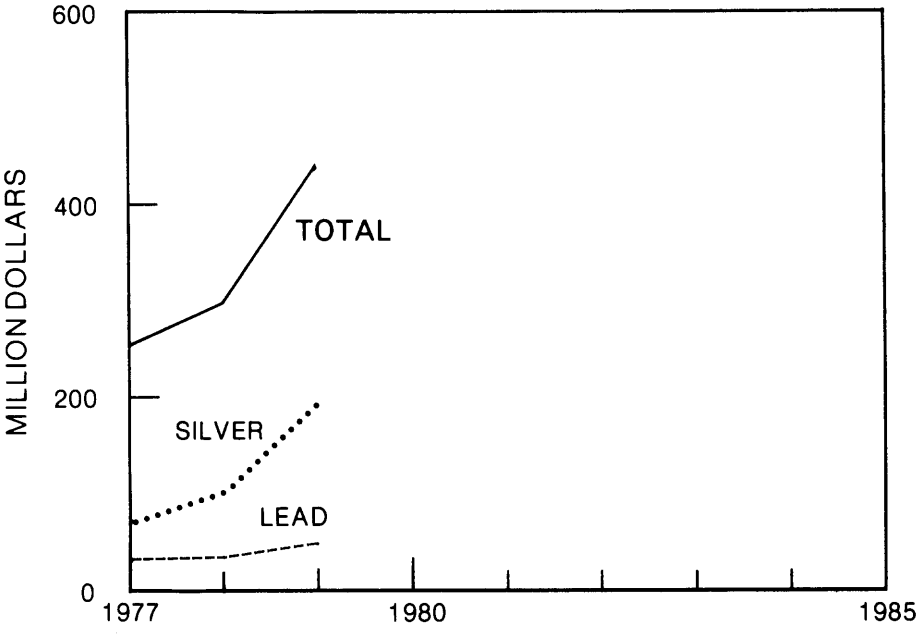

Figure 1.—Value of silver and lead, and total value of nonfuel mineral production in Idaho.

Trends and Developments.—In the Coeur d'Alene mining district, the State's largest producing area, most of the news involved corporate developments. An agreement between Hecla Mining Co. and Superior Oil Co., which would have solved Hecla's financial problems, fell through. In 1979, Rosario Resources Corp. purchased 16.7% of Hecla's stock from Narragansett Wire Co., a wholly owned subsidiary of El Paso Natural Gas Co. Rosario made the purchase for investment purposes; it now holds 19.94% of all outstanding Hecla shares. Late in 1979, Rosario and AMAX, Inc., announced an agreement whereby AMAX would acquire Rosario.

In October 1979, Hecla announced it would construct a new surface shaft at the Lucky Friday Mine. The shaft, costing nearly $26 million, will facilitate mining of ore below the 5,100-foot level. Groundbreaking for the new surface shaft is to begin in the first quarter of 1980; it should be completed in 1984. Hecla and Sunshine Mining Cos. reached an agreement that eliminated several longstanding operational conflicts in the Sunshine Unit Area, which is operated by the Sunshine Mine.

The previous 2 years (1978-79) saw corporate struggles in conjunction with the ownership of the Sunshine Mine. Hunt International Resource Corp. (HIRCO) was unable to complete its planned takeover of the Sunshine Mining Co. Sunshine's Board of Directors and the State of Idaho, under terms of its corporate takeover law, successfully blocked the Hunt offer and takeover. During March 1979, HIRCO sold its 28% interest in the Sunshine Mining Co. to a special holding company formed by the Board of Directors of Sunshine. This action resulted in the dismissal of all pending lawsuits by both sides in June. In early 1979, Sunshine's management also announced that it would move totally into the silver producing area, selling certain companies, including Anchor Post Products, Piezo Crystal Co., and Premier Metal Products. It sold its Idaho Garnet operation in Benewah County. Sunshine purchased J.R. Rayner, Ltd., a London-based silver trading company, and announced plans for a new silver refinery using a Sunshine-developed chemical-electrolytic technique to produce refined silver bullion.

Sunshine started sinking the No. 12 shaft

in August 1979. The 1,100-foot shaft will connect the 3,700- and 4,800-foot levels, and provide Sunshine with deep mining access to known veins. By the end of 1979, the company estimated an ore reserve of 171.8 million ounces of silver valued at more than $1.5 billion.

An Idaho Supreme Court decision in October 1979, upheld Silver Syndicate's claim to 50% of the ore mined by Sunshine from three orebodies near the Chester vein. This decision ended longstanding disputes over control of deep orebodies in and around the Sunshine Unit Area which consists of claims controlled by Sunshine, Hecla, and Silver Dollar. Sunshine is engaged in similar litigation with Metropolitan Mines over the "copper vein" system.

The largest civil trial in Idaho's history was conducted in 1978. Families of miners who perished in the 1972 Sunshine Mine fire sued five chemical firms for $660 million. The plaintiffs alleged that underground use of polyurethane foam contributed to the fire. The suit was dismissed in the Federal courts. Later in 1978, the chemical companies paid $6 million to the miners' families in an out-of-court settlement.

During 1978, Bunker Hill celebrated the 50th anniversary of the opening of its electrolytic zinc plant in Kellogg. Also in 1978, the company constructed a new silver refinery and made plans to increase its capacity in 1979. Studies have shown that new emission stacks at the Bunker Hill smelter are improving air quality in the Silver Valley; however, the company remains in dispute with the Environmental Protection Agency (EPA) over new standards. The Bunker Hill smelter was shut down in January 1978, and again in January 1979, because sulphur dioxide emission standards were violated during periods of cold stagnant air. The Hunt brothers of Texas resumed action in the district in 1979. Through a subsidiary, Lake Placid Oil, they purchased 9.69% of Gulf Resources and Chemical Co. stock, the parent of Bunker Hill. Price increases in silver prompted the company to announce it would deepen the No. 2 shaft at the Crescent Mine to gain access to deeper ore zones. The Crescent Mine borders the Sunshine Mine in the Big Creek area.

High silver prices enabled ASARCO Inc. to retire, earlier than expected, its preproduction debt of more than $20 million on the Coeur Mine.

Exploration, with a diamond drilling program, continued on the Camp property (Coeur d' Alene Mines, Merger Mines, Plainview Mining) adjacent to the Coeur property.

In 1979, American Silver Mining Co. announced that a joint exploration venture with ASARCO and Coeur d'Alene Mines would start on the American Silver property in the Coeur d'Alene district. This property borders the Coeur Mine on the south.

Day Mines closed the Tamarack Mine in the last quarter of 1978 because of low zinc prices. The firm did not produce in 1979.

Many exploration and development projects were under way outside the Coeur d'Alene district. Canadian Superior Mining Co. started a pilot plant in 1978 to recover gold from a cyanide heap leach operation near Stibnite, Valley County. A gold-silver bar weighing 60 ounces was produced. Canadian Superior also acquired the Sunnyside Mine in the Thunder Mountain mining district near the Stibnite operation. Canadian Superior conducted further exploration in 1979, and continued to acquire permits in preparation of opening a small open pit gold mine at Stibnite.

Numerous companies, including Homestake Mining Co., ASARCO, AMAX, Texasgulf, Inc., and Houston Oil and Minerals Co., were actively exploring volcanic and related rocks in the Seven Devils area north and west of Cambridge in Adams County. Texasgulf purchased the Iron Dyke Mine on the Oregon side of Hells Canyon, and, in 1979, began shipping rock to Silver King's mill in Adams County. The company also purchased the Red Ledge Mine in Idaho for a reported $1.5 million.

Inspiration Development Co. was active in the Bayshore district, at the Salmon River Copper Mine west of Shoup in Lemhi County, and at the Ima Mine in the Blue Wing district of Lemhi County.

Exploration in 1978-79 was conducted by Bear Creek Mining Co. at Triumph Mine near Haley in Blaine County. In the Knapp Lake area of Custer County, near Stanley, Anaconda was exploring for molybdenum, while American Nickel and Copper Co. searched the area for uranium. Noranda Mines, Ltd., also explored for uranium on its Basin Creek Group in the same general vicinity.

Molybdenum exploration was being conducted by Cominco on the Napoleon Hill property near Leesburg in Lemhi County; Abella Mining Co. of Vancouver, B.C., Canada, was further evaluating a molybdenum-

bearing zone (Little Falls Prospect) on the South Fork of the Payette River. A little farther south, AMAX continued drilling on the Cumo Prospect near Grimes Pass.

The dramatic price increase in gold caused an upsurge in dredge mining proposals and dredge mining applications in the latter part of 1977. Several small suction dredges were operated intermittently in streams around Elk City and other old gold camps in Idaho. Dredge mining permit applications to the State Board of Land Commissioners quadrupled in 1979 compared with 1978. Bear Valley Associates of Houston, Tex., applied for dredge mining and stream alteration permits for operations on Upper Bear Valley Creek, Valley County. The firm proposes to recover uranium, columbium, tantalum, and rare-earth oxides from patented placer claims.

High uranium oxide prices stimulated 1977 exploration that continued unabated through 1979. Several companies, including Minatome Corp., St. Joe American, Conoco, Pathfinder Mines, Rocky Mountain Energy Co., and Urania Exploration Co., were actively exploring in areas east and west of Priest Lake in northern Idaho. Several companies are exploring for uranium in the black shale of the Phi Kappa Formation east of Sun Valley in Blaine and Custer Counties. The Washington Public Power Supply System drilled claims near Cobalt and Ellis in Lemhi and Custer Counties and on its property near Gibbonsville.

The Iron Mask Mine at Talache, Bonner County, was in development during 1979, and shipped silver-bearing ore to the Cominco smelter at Trail, B.C., Canada. Sydney Mining Co. continued testing and geologic assessment of its 3,000-acre holding adjacent to the Delamar Mine in Owyhee County.

In the nonmetallic sector, phosphate production in southeastern Idaho continued at the same pace in 1978-79 as in previous years. In 1978, the U.S. Department of the Interior approved mining plans for two new phosphate open pits, the South Maybe Canyon Mine of Beker Industries and the North Trail Canyon Mine of J.R. Simplot. Beker Industries concluded a partnership agreement with Western Cooperative Fertilizer, Ltd., of Calgary, Alberta, Canada.

In 1979, Idaho Garnet Abrasive Co., a subsidiary of Sunshine Mining Co., was sold to the Emerald Creek Garnet Co. Both operations are mining garnet from placer deposits on Emerald Creek in Benewah County. All abrasive garnet now mined in Idaho will be marketed through Emerald Creek Garnet Co.

Legislation and Government Programs.—Federal actions or proposed actions that would affect the State's mineral sector during 1978-79 were:

1. Proposed replacement of the 1872 mining law by an all-leasing system.
2. U.S. Forest Service RARE II Wilderness study and inventory.
3. U.S. Bureau of Land Management (BLM) Wilderness studies under P.L. 94-579.
4. Proposed River of No Return Wilderness area.

In response to President Carter's proposal for a mineral leasing system, a new organization, Citizens for a Sound Mining Law, was formed in northern Idaho in 1978. Public hearings were held on the Forest Service RARE II study which could affect 8.2 million acres of the State. The final environmental impact statement on RARE II showed nearly 2.2 million acres proposed for addition to the Wilderness system. Most of this acreage surrounds the Idaho Primitive area or the proposed River of No Return Wilderness. Public hearings were also held throughout the State on the BLM planning process. These hearings indicated that of 12 million acres of BLM land, about 2.4 million acres could be classified as wilderness. Public hearings were also held in 1979 on the proposed River of No Return Wilderness area which could affect nearly 2.4 million acres of land in the central part of the State. Much of the controversy concerning this proposal was related to the cobalt area of Lemhi County, where the addition of wilderness peripheral to the Blackbird Mine could impinge upon the Nation's cobalt resources.

New constraints were imposed upon transportation of mineral products within the State. The Chicago, Milwaukee, St. Paul & Pacific Railroad, which filed for bankruptcy, discontinued all service in the State. Burlington Northern Inc. petitioned the Interstate Commerce Commission to allow abandonment of 39 miles of track connecting Wallace, Idaho, with Haugen, Mont. Ninety-seven percent of the freight on the Haugen-Wallace line is mineral products (ore concentrates, nonmetallic fertilizers, primary metals, etc.). Burlington Northern rail service between Wallace and Mullan would be transferred to the Union Pacific

Railroad.

New EPA lead standards, as proposed, have been criticized by the Bunker Hill Co. which operates the State's only smelter complex. It sees the standards as too stringent and economically unachievable. EPA is also seeking a penalty from Bunker Hill for excessive particulate pollution from the zinc fuming furnace.

U.S. Department of the Interior mineral resource agencies were active throughout the State in 1978-79. Mapping, both topographic and field, and hydrologic studies were conducted by the U.S. Geological Survey. Mineral appraisals were initiated in the Selway-Bitteroot Wilderness area and in southeastern Idaho. The U.S. Bureau of Mines initiated mineral appraisal studies in the Selway-Bitteroot Wilderness area and on BLM lands in southeastern Idaho. The Bureau was also appraising mineral resources of the Fort Hall Indian Reservation in southeasten Idaho. Alternate mining methods and the feasibility of recovering byproducts from phosphate rock operations were investigated by Bureau research centers. Extensive use was made of the Bureau's Mineral Industry Location System (MILS) and Minerals Availability System (MAS) in the RARE II and BLM Wilderness planning processes. The Bureau's research centers supported contracts for a field test on disposal of mill tailings in surface backfill, a program for destressing rock in advance of mining, and an evaluation and application of roadheaders in underground uranium mining.

By yearend 1979, under Title III of the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87), the Secretary of Interior had designated 31 schools and universities nationwide as State Mining and Mineral Resources and Research Institutes. The College of Mines and Earth Resources at the University of Idaho was designated as Idaho's Institute during 1978.

The 44th Idaho Legislature, second regular session, considered many new proposed laws for regulating the State's mineral industry in 1978. A new law was passed concerning design and construction of tailing ponds; the law requires the mineral operator to secure approval of the Idaho Department of Water Resources for tailing storage structures. Proposals to amend the Surface Mining and Dredge Mining Acts remained in committee or were vetoed by the Governor. A House Concurrent Resolution for amending Regulations 1 and 2 of the Mining License Tax died in committee.

The 45th Idaho Legislature, first regular session, met in 1979 and addressed relatively few mineral-related bills. One bill, House Concurrent Resolution 9, would have set royalties for mineral products from State lands to follow rules used by the Federal establishment. The bill died in committee. A pre-filed bill, one which was never introduced, would have called for reclaiming abandoned tailing ponds with funds for administration to be appropriated from the mine license tax payments.

The Idaho Bureau of Mines and Geology published a new State geologic map during 1978, and it conducted numerous geochemical and field geology studies, some under Federal contracts and grants. Several open-file reports were released during 1978-79. The Bureau of Minerals, Department of Lands, processed mineral lease applications for about 1,350 acres of State land during 1978, and more than 43,500 acres during 1979. Approximately 76,000 acres were under lease as of July 1, 1979. Approved active reclamation plans, as of July 1, 1979, totaled 526, covering approximately 20,000 acres. By the end of 1979 there were nine dredge mining permits approved covering 162 acres, with eight more permits pending.

For fiscal year 1978 (July 1, 1978 to June 30, 1979), State receipts for mineral royalties and rentals amounted to nearly $100,000. Total rentals and royalties paid the State (mineral, oil and gas, and geothermal) for the same period amounted to $1.1 million.

The Idaho State mine inspection program was terminated in 1979. Inadequate funding and duplication of services performed by the Federal Mine Safety and Health Administration were reasons for the elimination.

REVIEW BY NONFUEL MINERAL COMMODITIES

METALS

Antimony.—Antimony production and value increased in 1978 compared with that of 1977, but decreased in 1979. This decrease was because of production losses at the Sunshine Mine. Sunshine, the State's only producer, had underground transportation problems and was mining lower silver grade ores. Idaho ranked first in the Nation in antimony production for both years.

Cadmium.—Idaho's output of cadmium

came entirely from the Bunker Hill Co.'s zinc processing plant in Shoshone County. Production increased sharply in 1978 compared with that of 1977, but showed only a small increase in 1979.

Cobalt.—There was no recorded production of cobalt in the State; however, exploration and development by Noranda at the old Blackbird Mine in Lemhi County, continued. At the end of 1979, Noranda made a decision to place the mine into production. The Forest Service determined that an environmental impact statement must be completed for the project because of the relocation of the tailings disposal area.

Copper.—Tonnage and value of Idaho's mined copper increased in 1978 compared with that of 1977; however, production decreased in 1979 because of the tenor of the ore being mined in the Coeur d'Alene district. This district was the source of nearly 90% of the State's production; much of the remainder came from the Copper Cliff Mine in Adams County. At the end of 1978, a Salt Lake City firm announced the discovery of what may be a large copper deposit in Idaho County. The announcement precipitated a land-use classificaion controversy since the deposit borders the Hells Canyon Recreation Area on the Snake River.

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
1977, total	25	1,884,858	12,894	$1,912,308	15,291,964	$70,648,875
1978:						
Custer	6	71,258	27	5,227	97,600	527,040
Shoshone	11	1,440,916	2,891	559,553	16,309,864	88,073,263
Undistributed[1]	9	659,372	17,574	3,401,449	1,971,953	10,698,545
Total	26	2,171,546	20,492	3,966,229	18,379,417	99,248,848
1979:						
Custer	5	47,332	33	10,150	118,918	1,318,801
Kootenai	1	2,589	285	87,638	30,823	341,827
Shoshone	8	1,404,648	2,808	863,461	15,197,476	168,540,010
Undistributed[2]	20	666,843	21,014	6,461,808	1,796,992	19,928,641
Total	34	2,121,412	24,140	7,423,057	17,144,209	190,129,279

	Copper		Lead		Zinc		Total value
	Metric tons	Value	Metric tons	Value	Metric tons	Value	
1977, total	3,676	$5,413,405	42,872	$29,016,391	28,121	$21,326,529	$128,317,508
1978:							
Custer	14	20,887	328	243,459	262	179,077	975,690
Shoshone	3,349	4,910,282	44,430	33,009,978	32,089	21,930,876	148,483,952
Undistributed[1]	525	769,581	3	2,253	1	359	14,822,687
Total	3,888	5,700,750	44,761	33,255,690	[3]32,353	22,110,812	164,282,329
1979:							
Custer	17	34,103	233	269,982	79	65,126	1,638,162
Kootenai	6	11,846	5	5,619	--	--	446,930
Shoshone	3,231	6,625,803	42,299	49,089,164	29,569	24,315,324	249,433,762
Undistributed[2]	365	748,831	99	114,421	12	10,274	27,263,975
Total	[3]3,618	7,420,583	42,636	49,479,186	29,660	24,390,724	278,842,829

[1]Includes Adams, Blaine, Elmore, Kootenai, Lemhi, and Owyhee Counties combined to avoid disclosing company proprietary data.
[2]Includes Ada, Adams, Bannock, Bear Lake, Blaine, Boise, Bonner, Butte, Cassia, Elmore, Lemhi, Nez Perce, and Owyhee Counties combined to avoid disclosing company proprietary data.
[3]Data do not add to total shown because of independent rounding.

Table 5.—Idaho: Mine production (recoverable) of gold, silver, copper, lead, and zinc, 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)
1978							
Lode ore:							
Gold, gold-silver, and silver	15	1,302	19,724	16,316	3,062	15,652	1,993
Copper, lead, lead-zinc, and zinc[1]	11	870	768	2,063	826	29,109	30,359
Total lode material	26	2,172	20,492	18,379	3,888	44,761	[2]32,353
1979							
Lode ore:							
Gold, gold-silver, and silver[1]	13	1,330	23,510	15,445	2,996	17,908	2,141
Copper, lead, and lead-zinc[1]	21	791	630	1,700	622	24,728	27,519
Total lode material	34	2,121	24,140	[2]17,144	3,618	42,636	29,660

[1]Combined to avoid disclosing company proprietary data.
[2]Data may not add to totals shown because of independent rounding.

Table 6.—Idaho: Mine production (recoverable) of gold, silver, copper, lead, and zinc, 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)
1978					
Lode:					
Smelting of concentrates	2,921	16,443	3,885	44,732	32,350
Direct smelting of ore, amalgamation, and cyanidation[1]	17,571	1,937	4	29	3
Total[2]	20,492	18,379	3,888	44,761	32,353
1979					
Lode:					
Smelting of concentrates	2,840	15,339	3,609	42,519	29,641
Direct smelting of ore and cyanidation[1]	21,300	1,805	9	117	19
Total	24,140	17,144	3,618	42,636	29,660

[1]Combined to avoid disclosing company proprietary data.
[2]Data may not add to totals shown because of independent rounding.

Gold.—Production expansion in 1978-79 was largely a result of the increased capacity of Earth Resources' Delamar Mine in Owyhee County. A major price increase of the metal in the latter half of 1979 significantly enlarged the reserves at the Delamar. Gold production from the base metal deposits in the Coeur d'Alene region remained constant. Idaho ranked fifth in the Nation in gold production.

Lead.—Lead production declined in 1979 compared with that of 1978; lower grade ores were being mined in the Coeur d'Alene region. Most production came from the Bunker Hill and Hecla's Star and Lucky Friday units. The State ranked second in the Nation in newly mined lead for both years. Outside the Coeur d'Alene region, only the Clayton Silver Mine in Custer County had notable lead production. The State contained 33 producing lead mines in 1979.

Molybdenum.—There was no molybdenum production in the State either year; however, exploration expenditures rose to new highs. Cyprus Mines Corp. was completing initial studies in 1979 for the opening of the Thompson Creek Mine near Challis in Custer County. The company patented additional claims and began a

comprehensive environmental impact statement for a mine-mill complex north of the Salmon River. There were also exploration projects elsewhere in Custer and Lemhi Counties. B and B Mining Co. continued an exploration adit at its Spring Creek deposit north of Salmon River near Shoup in Lemhi County. Exploration at the Ima Mine by Inspiration Development Co. continued to outline deposits of tungsten and molybdenum.

Silver.—Silver production in 1979 decreased compared with that of 1978, while value received nearly doubled. This was the result of the lower grade ores being mined in the Coeur d'Alene region in conjunction with the rapidly increased metal price. In 1979, The Galena Mine surpassed the Sunshine Mine as the Nation's top silver producer. The Sunshine, Galena, Lucky Friday, Coeur, and Delamar Mines each produced more than 2 million ounces. Idaho continued to be the Nation's largest silver producer, accounting for nearly 45% of newly mined metal.

Tungsten.—There was no tungsten production recorded in 1978-79. Exploration for the metal continued in Custer and Valley Counties; the largest exploration project was at the Ima Mine in Lemhi County.

Vanadium.—Production of vanadium from the Kerr-McGee plant at Soda Springs, Caribou County, Idaho, continued to decline throughout 1978-79. This was primarily because of the decrease in the quantity of ferro-phosphorus slag from the phosphate rock processing operation at Monsanto.

Zinc.—Production and value of zinc increased in 1978, compared with that of 1977. In 1979, production decreased compared with that of 1978, although there was a significant increase in value. The 1979 production decrease can be attributed to mining lower grade ores. Silver price increases during the latter half of 1979 more than offset the lower grade of zinc ore. Nearly 98% of Idaho's zinc production came from the Coeur d'Alene district; the only notable producer outside the district was the Clayton Silver Mine in Custer County.

NONMETALS

Abrasives (Natural).—Two Benewah County operations accounted for all State garnet production in 1978-79. The 1979 production fell to nearly one-half of that of 1978 because of changing market conditions. Sunshine Mining Co., owner of Idaho Garnet Abrasive Co., sold its entire garnet operation to a private individual in Benewah County.

Barite.—Rocky Mountain Refractories in Blaine County was the State's only 1978 barite producer; no barite was produced in 1979. NL Industries, Baroid Div., continued exploration and development of the Old Soldier barite deposit west of Hailey in Blaine County; production schedules call for shipments from this deposit in early 1982.

Cement.—Cement production from the Idaho Portland Cement Co. at Inkom in Bannock County remained constant in 1978-79. There was a slight increase in the quantity of masonry cement produced.

Clays.—Clay production remained constant both years. The largest producer in 1978 was the J. R. Simplot Co. from its pits in Latah County. The company has continued research on reclamation techniques in and around operations at Bovill.

Gem Stones.—Opals (Clark County), star garnets (Benewah County), fire opals, and jasperoid (Owyhee County) were the most sought-after gems in the State. During the preceding 2 years, markets have developed in the East for "Owyhee picture rock," the gem-quality jasperoid found mostly in Owyhee County.

Lime.—Production of lime decreased dramatically throughout 1978-79 because of falloff of the sugar beet processing industry in southern Idaho.

Perlite.—Oneida Perlite, Oneida County, continued to be the State's only producer. Production and value increased in 1978 and again in 1979. Nearly one-half of the total perlite production for making expanded perlite was shipped to Oneida's plant at Malad City.

Phosphate Rock.—Total marketable production of phosphate rock increased in both 1978 and 1979; value also increased substantially in 1979. Five mines were in operation in 1978, with six producers in 1979; Alumet's Lane Creek Mine was the new producer. Phosphate ore reduction was split almost evenly between elemental phosphorus and wet-process phosphoric acid. Late in 1979, Idaho Power requested a nearly 50% increase in the electrical utility rates to FMC's phosphoric acid plant. This increase may have an effect on the feasibility of continued elemental phosphorus production in the State. J. R. Simplot Co. continued exploration on phosphate leases in Caribou County.

Pumice.—Pumiceous material production decreased nearly 35% in 1979 compared

with that in 1978; value received dropped a corresponding amount. Amcor, Inc., Bonneville County, was the State's leading producer; its entire output was consumed in concrete aggregate. Material was also produced in Bingham and Oneida Counties.

Sand and Gravel.—Production and value of sand and gravel increased somewhat in 1978-79 as a result of increased economic activity throughout the State. Ada, Canyon, and Bonneville Counties continued to have the greatest production.

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

Use	1977			1978			1979		
	Quantity (thousand short tons)	Value (thousands)	Value per ton	Quantity (thousand short tons)	Value (thousands)	Value per ton	Quantity (thousand short tons)	Value (thousands)	Value per ton
Concrete aggregate	2,208	$5,309	$2.40	2,681	$6,728	$2.51	2,402	$6,255	$2.60
Plaster and gunite sands	NA	NA	NA	W	57	W	21	W	W
Concrete products	172	466	2.71	181	479	2.65	180	479	2.66
Asphaltic concrete	1,156	3,015	2.61	998	3,101	3.11	755	2,246	2.98
Roadbase and coverings	3,224	5,265	1.63	3,069	5,717	1.86	3,497	7,476	2.14
Fill	940	1,140	1.21	948	1,408	1.48	579	941	1.62
Snow and ice control	NA	NA	NA	W	120	W	W	49	W
Railroad ballast	--	--	--	--	--	--	183	429	2.35
Other uses	49	89	1.80	27	68	2.51	109	274	3.03
Total[1] or average	7,750	15,282	1.97	7,975	17,680	2.22	7,719	18,149	2.35

NA Not available. W Withheld to avoid disclosing company proprietary data; included in "Other uses."
[1]Data may not add to totals shown because of independent rounding.

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

Use	1977			1978			1979		
	Quantity (thousand short tons)	Value (thousands)	Value per ton	Quantity (thousand short tons)	Value (thousands)	Value per ton	Quantity (thousand short tons)	Value (thousands)	Value per ton
Construction:									
Sand	1,926	$3,887	$2.02	2,395	$5,748	$2.40	2,029	$4,931	$2.43
Gravel	5,824	11,395	1.96	5,580	11,930	2.14	5,690	13,218	2.32
Total or average	7,750	15,282	1.97	7,975	17,680	2.22	7,719	18,149	2.35
Industrial sand	W	W	W	137	1,617	11.78	W	W	W
Grand total[1] or average	W	W	W	8,112	19,290	2.38	W	W	W

W Withheld to avoid disclosing company proprietary data.
[1]Data may not add to totals shown because of independent rounding.

Stone.—Roadstone and riprap continued to be the largest uses of crushed stone. Government agencies, the U.S. Forest Service, the Idaho State Highway Department, and the U.S. Army Corps of Engineers continued to be the largest producers. Limestone was used as flux rock by the Monsanto Co. and by Kerr-McGee for its vanadium processing plant in Caribou County.

[1]State mineral specialist, Bureau of Mines, Spokane, Wash.
[2]Associate director, Idaho Bureau of Mines and Geology, Moscow, Idaho.

Table 9.—Idaho: Crushed stone[1] sold or used by producers, by use

(Thousand short tons and thousand dollars)

Use	1977		1978		1979	
	Quantity	Value	Quantity	Value	Quantity	Value
Poultry grit and mineral food	W	16	5	15	5	15
Concrete aggregate	218	434	W	W	--	--
Bituminous aggregate	W	W	72	238	W	W
Dense-graded roadbase stone	143	346	W	W	122	324
Surface treatment aggregate	303	635	475	1,044	795	1,593
Other construction aggregate and roadstone	678	1,453	889	1,989	844	2,230
Riprap and jetty stone	618	1,457	519	1,038	369	796
Flux stone	725	3,041	W	W	W	W
Chemicals	W	62	26	78	31	93
Paper manufacture	29	79	30	68	50	117
Other uses[2]	363	483	607	2,200	736	3,620
Total[3]	3,077	8,005	2,624	6,670	2,952	8,787

W Withheld to avoid disclosing company proprietary data; included in "Other uses."
[1]Includes limestone, granite, sandstone, traprock, and miscellaneous stone (1977-78).
[2]Includes cement manufacture, macadam aggregate (1977-78), abrasives (1977), and roofing granules.
[3]Data may not add to totals shown because of independent rounding.

Table 10.—Principal producers

Commodity and company	Address	Type of activity	County
METALS			
Antimony:			
Sunshine Mining Co	Box 1080 Kellogg, ID 83837	Mine, mill, plant	Shoshone.
Copper:			
ASARCO Inc	Box 440 Wallace, ID 83873	Mine and mill	Do.
Silver King Mines	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.
The Bunker Hill Co	Box 29 Kellogg, ID 83837	Mine, mill, plant	Do.
Gold:			
Earth Resources	Box 52 Jordan Valley, OR 97910	Surface mine and mill.	Owyhee.
Hecla Mining Co	Box 320 Wallace, ID 83873	Mine and mill	Shoshone.
Lead:			
Hecla Mining Co	Box 320 Wallace, ID 83873	do	Do.
The Bunker Hill Co	Box 29 Kellogg, ID 83837	Mine, mill, plant	Do.
Day Mines, Inc	Box 1010 Wallace, ID 83873	Mine	Do.
Clayton Silver Mines	Box 890 Wallace, ID 83873	Mine and mill	Custer.
Silver:			
ASARCO Inc	Box 440 Wallace, ID 83873	do	Shoshone.
Hecla Mining Co	Box 320 Wallace, ID 83873	do	Do.
Sunshine Mining Co	Box 1080 Kellogg, ID 83837	do	Do.
Earth Resources	Box 52 Jordan Valley, OR 97910	Surface mine and mill.	Owyhee.
Clayton Silver Mines	Box 890 Wallace, ID 83873	Mine and mill	Custer.
The Bunker Hill Co	Box 29 Kellogg, ID 83837	Mine, mill, plant	Shoshone.
Silver King Mines	1204 Deseret Bldg. Salt Lake City, UT 84111	Mine and mill	Adams.
Vanadium:			
Kerr-McGee Corp	Box 478 Soda Springs, ID 83276	Plant	Caribou.
Zinc:			
The Bunker Hill Co	Box 29 Kellogg, ID 83837	Mine, mill, plant	Shoshone.
Hecla Mining Co	Box 320 Wallace, ID 83873	Mine and mill	Do.

Table 10.—Principal producers —Continued

Commodity and company	Address	Type of activity	County
METALS —Continued			
Zinc —Continued			
Day Mines, Inc	Box 1010 Wallace, ID 83873	Mine	Shoshone.
Clayton Silver Mines	Box 890 Wallace, ID 83873	Mine and mill	Custer.
NONMETALS			
Abrasives:			
Idaho Garnet Abrasive Co	Box 1080 Kellogg, ID 83837	Placer mine and plant.	Benewah.
Emerald Creek Garnet	Box 176 Fernwood, ID 83830	Placer mine	Do.
Barite:			
Rocky Mountain Refractories	2436 West Andrew Ave. Salt Lake City, UT 84104	Mine	Blaine.
Cement:			
Idaho Portland Cement Co	Old National Bank, Rm. 622 Inkom, ID 83245	Surface mine and plant.	Bannock.
Clays:			
Interpace Corp	Box 785 Ione, CA 95640	Surface mine	Benewah.
J. R. Simplot Co	Box 912 Pocatello, ID 83201	do	Latah.
Pullman Brick Co	5657 Warm Springs Ave. Boise, ID 83706	Surface mine and plant.	Elmore.
A. P. Green Refractories	Box 158 Troy, ID 83871	do	Latah.
Gypsum:			
E. J. Wilson & Sons	Dubois, ID 83423	Surface mine	Lemhi.
Consumers Coop Association	502 Pioneer Rd. Wieser, ID 83672	do	Washington.
Lime:			
Utah & Idaho Sugar Co	Box 1855 Idaho Falls, ID 83410	Plant	Bonneville.
Amalgamated Sugar Co	First Security Bank Bldg. Ogden, UT 84402	do	Various.
Perlite:			
Oneida Perlite Co	Box 162 Malad City, ID 83252	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.
FMC Corp	1356 North Main Pocatello, ID 83201	Plant	Power.
Stauffer Chemical Co	Star Route Randolph, UT 84064	Surface mine	Caribou.
Monsanto Co	800 North Lindbergh St. Louis, MO 63166	do	Do.
Pumice:			
Amcor, Inc	Box 1141 Idaho Falls, ID 83401	Quarry	Bonneville.
Producers Pumice	6001 Fairview Ave. Boise, ID 83704	do	Do.
Hess Pumice Products	Box 209 Malad City, ID 83252	do	Oneida.
Sand and gravel:			
MONROC	Box 1221 Idaho Falls, ID 83401	Pit	Various.
Idaho Concrete Pipe Co	222 Caldwell Blvd. Nampa, ID 83651	Pit	Do.
Stone:			
U.S. Forest Service, Region 4	U.S. Federal Bldg. Ogden, UT 84403	Quarry	Do.
Idaho Department of Transportation	Box D Coeur d'Alene, ID 83814	do	Do.
Idaho Portland Cement Co	Old National Bank, Rm. 622 Inkom, ID 83245	Quarry and plant	Bannock.
Deatley Corp	Box 648 Lewiston, ID 83501	Quarry	Various.
Monsanto Co	800 North Lindbergh Blvd. St. Louis, MO 63166	do	Caribou.

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