

# Developments in Minerals, Mining and Energy in Idaho for 1982

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IN IDAHO FOR 1982<sup>1</sup>

by

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INTRODUCTION

This report on Idaho's mineral industry and energy resources for 1982 is a cooperative effort among several state and federal agencies and an industrial organization. The Idaho Bureau of Mines and Geology acknowledges the contributions of the Idaho Bureau of Minerals, the Idaho Oil and Gas Conservation Commission, the U. S. Bureau of Mines, and the Idaho Mining Association. Numerous individuals in industry and the U. S. Forest Service and Bureau of Land Management have also contributed information. Previous reports from 1977 are available from the Idaho Bureau of Mines and Geology.

MINERAL ECONOMICS

"The toughest times the industry has ever experienced" was the phrase frequently heard from mining men during 1982 as the recession staggered all areas of the United States' economy and the rest of the

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world as well. Whereas 1981 was a year of "merger mania" with oil companies flush with cash gobbling up natural resource-based companies, 1982 witnessed the virtual shutdown of the mineral sector. The gloomy prediction that some areas of the industry might never recover was commonplace.

Some trade magazines, such as *Engineering and Mining Journal*, published separate columns early in the year listing lay-offs and closures. By midyear the columns were replaced by long tables as the number of closures increased. Unemployment in the mining industry averaged 18 percent in September and October.

Idaho has been severely affected by the recession. Mine closures in the Coeur d'Alene district included the Star, the Consolidated Silver project, and the Sunshine mine. Although the Galena, Coeur, and Lucky Friday mines operated all year, Hecla reduced personnel and rolled back salaries and Asarco curtailed the American Silver project. Lay-offs were frequent in the phosphate industry in southeast Idaho. Even the Clayton silver mine in central Idaho closed its doors. Exploration expenditures in the state were way down, and several companies, among them Dennison Mines, Union Carbide, Bear Creek Mining, and Inspiration Development Corporation, placed their important projects on hold. Exploration offices were closed in Spokane, Washington, and Missoula, Montana.

Yet the year ended on a note of cautious optimism as precious metal prices rebounded strongly and most companies in Idaho reopened their mines and put people back to work. Base metal prices, however, stayed low. Except for the precious metal markets, most of the industry remained depressed. The Idaho Mining Association estimated that at year's end 3,300 employees in the state's mining and minerals industry were permanently, indefinitely, or temporarily laid off. Over 40 percent of the mining work force had been laid off from a statewide high of 8,100 only 18 months before.

Besides the economic woes of the industry, mineral analysts debated the precarious dependency of the United States on foreign sources for strategic and critical minerals. The unreliability of international mineral trade has been notably revealed by the oil embargo in 1973 and the cobalt crisis in 1978. In April, President Reagan addressed the

problem and submitted the National Materials and Minerals Program Plan and Report to the congress pursuant to the National Materials and Minerals Policy, Research and Development Act of 1980. In August, a major conference was held on the topic of strategic metals in Coeur d'Alene. The meeting was chaired and moderated by Idaho's senior senator, James A. McClure. There was little consensus on a solution to the problem, but it was noted that as the world "shrinks" the U. S. will have to continue to depend on outside sources for some strategic and critical materials.

Preliminary production figures for 1982 provided by the U. S. Bureau of Mines (Table 1) show the depth of the recession in Idaho's mining industry. Total value of all nonfuel mineral production dropped by over \$100 million from 1981. Value decreased almost \$200 million since the boom year of 1980 (Figure 1). Most of this decrease is due to the falling price of silver.

Metal prices were severely depressed throughout most of the year. The Comex price for copper started the year at 74¢ per pound with weak demand and fell to a bottom of 54¢ in mid-June, but recovered to 69¢ by the end of the year. Lead had a U. S. producer price of 29¢ per pound in January that slowly eroded to 20¢ by December. Zinc started at 44¢ per pound, slipped to 35¢ at midyear, and closed in the 36-to-40¢ range. Gold opened at nearly \$400 per ounce, fell to a low of \$297 in June, and recovered to \$448 at year's end. Phosphate production was greatly curtailed nationwide. Idaho produces approximately 15 percent of the nation's phosphate.

Silver, so important to Idaho's economy, had a roller coaster ride, following gold through dramatic price changes. The metal started the year in the \$8 per ounce range and then slipped to a four-year low of \$4.88 on June 21. By December the Comex spot price was \$10.61. The wide fluctuation in price was related to the general economy. By year's end the national economy showed signs of recovery as the Federal Reserve Board reversed its anti-inflation policy of tight money and high interest rates. Investor demand was also fueled by Peru's ban on the sale of refined silver in July, by the change in U. S. policy on the sale of the silver stockpile (sales are now restricted due to legislation initiated by Senator McClure), and by the purchase of silver on the open market by Russia in October.

Table 1. Nonfuel mineral production in Idaho<sup>1/</sup>, compiled by the U. S. Bureau of Mines.

Mineral	1981		1982	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Antimony ore and concentrate, antimony content.....short tons...	432	W	294	W
Clays.....thousand short tons...	26	\$ 288	8	\$ 101
Copper (recoverable content of ores, etc.) metric tons...	4,245	7,966	3,074	5,035
Gem stones.....	NA	75	NA	75
Lead (recoverable content of ores, etc.) metric tons...	38,397	30,923	W	W
Phosphate rock.....thousand short tons...	5,361	108,964	W	W
Sand and gravel (construction) thousand short tons...	3,063	7,329	2,340	6,258
Silver (recoverable content of ores, etc.) thousand troy ounces...	16,546	174,033	14,830	117,901
Stone (crushed).....thousand short tons...	1,437	6,206	p/ 1,200	p/ 6,000
Combined value of cement, garnet (abrasives), gold, gypsum, lime, perlite, pumice, sand and gravel (industrial), stone (dimension), tungsten, vanadium, zinc, and values indicated by symbol W.....	XX	89,093	XX	164,810
Total.....	XX	r/\$424,877	XX	\$300,180

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

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

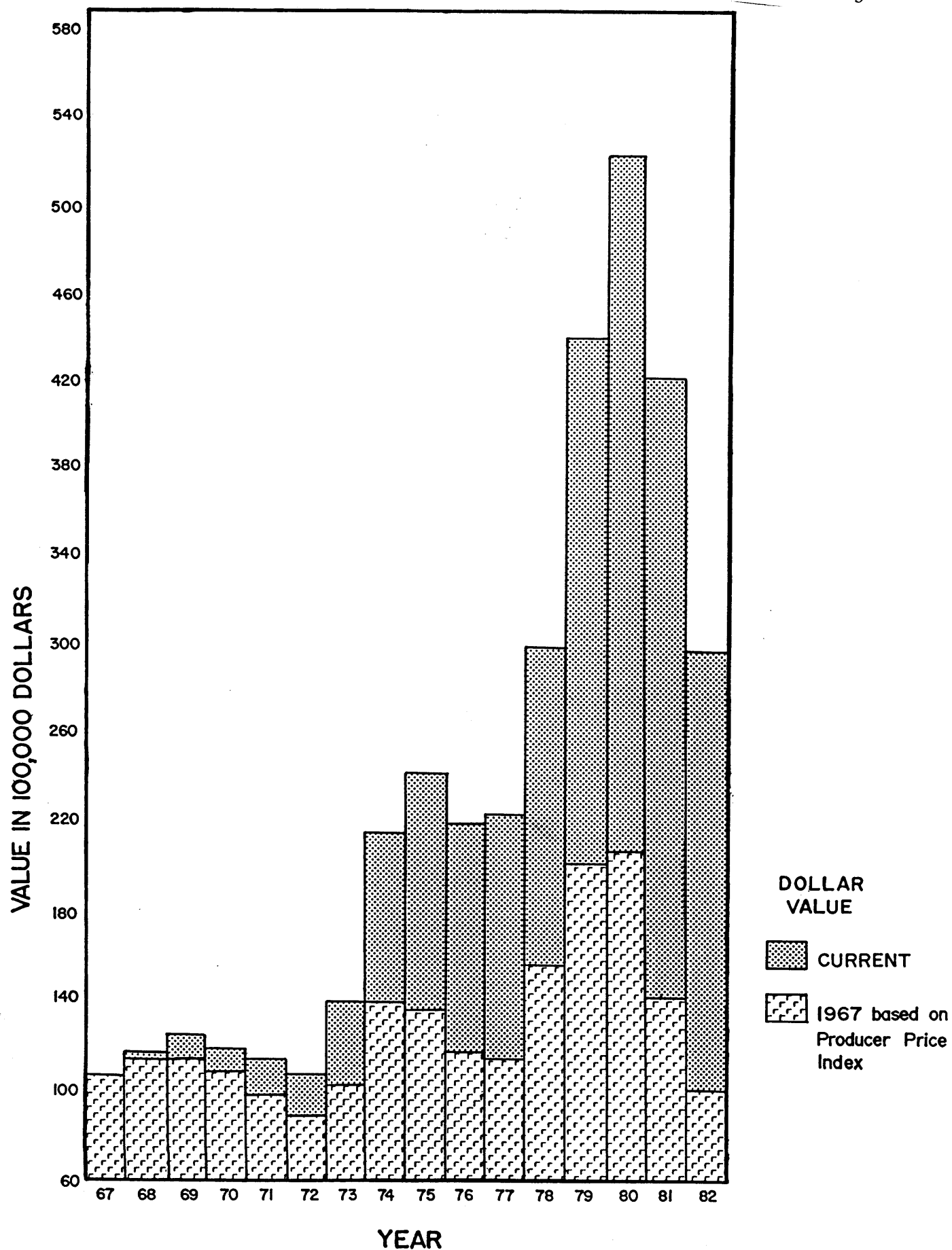


Figure 1. Value of mineral production in Idaho, 1967-1982.

There were 93,789 claims on federal land in Idaho at the end of August according to the U. S. Bureau of Land Management. A total of 2,987 new claims were staked in 1982, down from 5,000 in 1981.

## MINERAL OPERATIONS

### METALLIC MINERALS

#### Coeur d'Alene Mining District

The Coeur d'Alene district in northern Idaho--and the heart of Idaho's mining industry--was hard hit by the recession. The closure of the Bunker Hill mine in 1981 and other mine closures in 1982 brought the unemployment rate in Shoshone County to 32.7 percent by December. The situation had eased at year's end with the stimulus of improved silver prices, but the Bunker Hill and Crescent mines remained closed and the Star mine was salvaged and abandoned. Unemployment remained high.

In 1982 the district produced 13,013,000 ounces of silver, 26,567 tons of lead, 8,914 tons of zinc, 3,602 tons of copper, and 2,966 ounces of gold for a net value of \$130,214,000. Since lode mining began in 1884, the Coeur d'Alene district has yielded precious and base metals valued at \$4,212,164,000, including 963,544,000 ounces of silver, making it one of the largest silver districts in the world.

The production figures for 1981 and 1982 as filed with the Shoshone County assessor's office are shown in Tables 2 and 3. The decrease in value and tonnage for all of the district's mines from 1981 to 1982 is expected to pose serious economic problems for Shoshone County government, which derives substantial tax revenue from mine profits.

*Bunker Limited Partnership* (previously the Bunker Hill Company, a wholly-owned subsidiary of Gulf Resources and Chemical Corporation). The Idaho Mining Association estimates that the Bunker Hill mining and smelting complex accounted for one-fourth of Idaho's mining industry in 1980. The company's plants produced 26 percent of the refined silver, 21 percent of the refined lead, 21 percent of the primary slab zinc, and 15 percent of the cadmium in the United States. The company employed 54 percent of the people working in the state's mining sector and placed \$105.8 million in the state's economy. Then, in August 1981, Gulf

Resources announced that the Bunker Hill Company would close its operations at Kellogg, idling 2,100 workers and shutting down one of the largest lead, zinc, and silver mining, smelting, and refining plants in the United States.

In December 1981 three businessmen, Duane Hagadone, Harry F. Magnuson, and J. William Pfeiffer, signed a purchase option agreement to buy the complex for \$65 million. The "White Knights," as they were dubbed by the press, were joined in the buy-out effort in January 1982 by the J. R. Simplot Company, Sunshine Mining Company, and Coeur d'Alene Mines Corporation. The prospective new owners attempted first to renegotiate the existing labor contract. They presented to the local membership of the United Steelworkers Union a tentative contract that included a 25 percent wage rollback, a reduced work force, and other benefit reductions. The local membership voted to accept the contract on January 17, but the national leadership rejected it. Countering this action, the local membership then elected new officers who accepted the buyers' offer, but the legality of the election was in doubt. As a last desperate effort, some of the workers started the Silver Valley People's Union and attempted to decertify the Steelworkers Union.

On January 20, 1982, the investors cancelled their option with Gulf Resources and expressed no further interest in purchasing the Bunker Hill complex. Discussions continued, however, and federal mediators including Idaho's congressional delegation tried to organize a meeting between the union leadership and the investors, but to no avail.

In April, Bunker Hill officials announced that Jack Kendrick, Bunker Hill's president, along with several other company executives, had put together a plan to buy the mining and smelting complex, but had been unsuccessful. The Acquisitions Funding Corporation of San Francisco, a subsidiary of the General Electric Corporation, would have provided funding. When metal prices dropped below what was needed for Bunker Hill to make money, AFC was forced to back out of the deal.

Hopes that somebody might revive the company were earlier dashed when Gulf Resources announced in February that the heart of the smelter, the Lurgi sintering machine, had been sold to Industrias Penoles S.A. de C.V. (a Mexican firm) for \$1.3 million. Industrias Penoles operates a 180,000-ton-per-year lead smelter near Torreon, Mexico. But in early

Table 2. Net production and earnings in 1981 in the Coeur d'Alene mining district, compiled from sworn statements on file with the Shoshone County Assessor.

	Tons Extracted	Gross Value	Cost of Extraction	Freight and Treatment	Betterments and Repairs	Net Profit (Net Loss)
Bunker Hill Company						
(Bunker Hill and Crescent mines)	626,711	\$35,451,137	\$27,074,268	\$10,231,875	\$1,350,105	\$(3,205,111)
(Star unit--70% share 1/1/81- 4/30/81, 50% share 5/1/81-12/31/81)	170,843	16,145,868	10,974,285	5,601,489	35,212	( 465,118)
Callahan Mining Corporation						
(Galena mine)	196,500	34,928,475	13,241,157	984,007	272,577	20,430,734
Coeur d'Alene Mines Corporation						
(Coeur mine)	164,385	27,513,408	7,346,612	836,723	131,898	19,198,175
Hecla Mining Company						
(Lucky Friday mine)	148,864	29,865,004	15,498,163	5,780,710	17,799,248	(9,213,116)
(Sunshine unit--33.25% share*)	51,645	8,195,341	7,556,141	--	--	639,200
(Star unit--30% share 1/1/81- 4/30/81, 50% share 5/1/81-12/31/81)	131,679	14,507,306	8,636,458	7,622,340	--	(1,751,492)
(lessees--Consolidated Silver venture)	27,584	2,271,433	4,874,977	--	--	(2,603,544)
Sunshine Mining Company						
(Sunshine unit--66.75% share*)	144,938	28,451,982	25,835,665	1,136,274	3,594,461	(2,114,418)
(areas of the Sunshine mine not in the Sunshine unit area*)	571	--	--	--	--	--
TOTALS	1,663,720	\$197,329,954	\$121,037,726	\$32,193,418	\$23,183,501	\$20,915,310

\* Sunshine Mining Company is the owner of the Sunshine mine. Total production for 1981 was 197,154 tons. Hecla Mining Company claims a 33.25% share and Sunshine Mining Company claims a 66.75% share of the Sunshine unit area, a major portion of the Sunshine mine.

-- No data available.

Table 3. Net production and earnings in 1982 in the Coeur d'Alene mining district, compiled from sworn statements on file with the Shoshone County Assessor.

	Tons Extracted	Gross Value	Cost of Extraction	Freight and Treatment	Betterments and Repairs	Net Profit (Net Loss)
Callahan Mining Corporation (Galena mine)	201,877	\$30,792,568	\$13,090,151	\$2,049,199	\$ 206,196	\$15,447,022
Coeur d'Alene Mines Corporation (Coeur mine)	134,863	20,515,652	7,268,672	1,634,734	45,524	11,566,722
Hecla Mining Company (Lucky Friday mine)	210,876	35,998,455	19,246,055	3,935,126	11,745,740	1,071,534
(Sunshine unit--33.25% share*)	25,764	3,137,250	4,253,594	--	--	(1,116,344)
(Star unit--50% share)	63,236	2,522,697	3,511,696	--	2,060	( 991,059)
(lessees--Consolidated Silver venture)	1,272	(22,657)	1,624,153	--	--	(1,646,810)
Pintlar Corporation** (Bunker Hill and Crescent mines)	4,000	13,179,054	10,381,268	3,805,616	--	(1,007,830)
(Star unit--50% share)	63,236	8,157,907	5,632,819	2,830,120	52,633	( 357,665)
Sunshine Mining Company (Sunshine unit--66.75% share*)	78,027	11,082,629	11,714,807	716,709	2,682,714	(4,031,601)
(areas of the Sunshine mine not in the Sunshine unit area*)	1,033	--	--	--	--	--
TOTALS	784,184	\$125,363,555	\$76,723,215	\$14,971,504	\$14,734,867	\$18,933,969

\* Sunshine Mining Company is the owner of the Sunshine mine. Total production for 1982 was 104,824 tons. Hecla Mining Company claims a 33.25% share and Sunshine Mining Company claims a 66.75% share of the Sunshine unit area, a major portion of the Sunshine mine.

\*\* The Pintlar Corporation is a subsidiary of Gulf Resources and Chemical Corporation (see page of text).

-- No data available.



April this deal, too, fell through because of problems with the Mexican economy and the subsequent devaluation of the peso.

Bunker Hill announced early in March that bids to raze the surface plants and sell much of the equipment for salvage had been solicited from twenty salvage firms. Bids for the job, described as one of the largest salvage jobs in the United States, were due in April. The demolition plans were to be delayed, however, as other participants in the purchase of the property appeared.

In March a new "White Knight" appeared. Martin Baral, president of Expo Oil N.L. of Sydney, Australia, announced that his firm was interested in purchasing the mines and smelter. A letter of intent was signed with the leadership of the Steelworkers Union on March 18, agreeing to a 20 percent wage rollback that would be paid back with interest from future profits. On April 6 it was announced that Baral had been unsuccessful in forming a syndicate to purchase the operation and that Expo was abandoning its efforts.

In mid-April a purchase agreement was signed for Bunker Hill's sulfuric acid plants and fertilizer complex. An Oklahoma company, Chemical Marketing Services, and several other investors wished to buy the acid and fertilizer plants that would be operated by a new company named the Silver Valley Chemical Company. The president of Chemical Marketing, William D. Bohnefeld, stated that the new firm would employ 50 people. Sulfur would be shipped into the area for acid production. The option was extended from May 15 to the end of May. A labor agreement was signed in principle with the United Steelworkers Union in June. Final decision on the sale has been delayed due to major changes in the corporate management of Gulf Resources and Chemical Company.

In June the affairs of the Bunker Hill Company were complicated when a bitter takeover battle for Gulf Resources was won by Alan E. Clore, a British businessman, and his company, Zopress Commercial S.A. of Panama. Clore purchased 14 percent of Gulf's stock in April, thus gaining a controlling interest in the company. Eventually he would hold 15.4 percent of the stock. Rumors were rampant that the company would be liquidated. In September six vice presidents and the company manager were fired or resigned, adding to the confusion.

Negotiations were again underway in late August for the sale of the sintering plant, this time to a Moroccan company. On September 15 the Hecla Mining Company, Callahan Mining Company, and Coeur d'Alene Mines Corporation presented a bid for the Bunker Hill and Crescent mines and mill, excluding the smelter. A September 30 deadline passed and the three companies withdrew their offer. Other companies reportedly interested in the mines included Nerco Mining Company of Portland, Oregon, and the Sunshine Mining Company.

Only 100 people were employed at the vast complex in October. Gulf Resources had previously written off \$83.3 million on the closure, and increased its estimated loss by another \$13.5 million in August. Costs for maintaining the operation on caretaker status were estimated at \$200,000 per month. Fear of damage to the plants and surface facilities by winter weather proved groundless, as the building came through the 1981-1982 winter in good shape and most of the facilities were winterized by the end of 1982. The last metal production at Bunker Hill was in late July, ending almost continuous production extending back to the 1890's.

Gulf Resources signed a \$10 million closure agreement with the union, covering pensions, medical insurance, and severance pay benefits, in late July. In May, a class action suit had been filed against Bunker Hill challenging the cutoff of company medical benefits. Another similar suit was filed in June. After the closure agreement was signed, Bunker Hill filed suit against the union claiming that the two outstanding class action suits violated the terms of the agreement. This placed the entire closure agreement in jeopardy.

Nearly 1,400 former Bunker Hill employees were eligible to share in \$450,000 in federal funds due to the Federal Trade Adjustment Act of 1974. This act provides funding for workers in the zinc industry who are laid off due to increased foreign imports of this metal. The money can be used for job training, job hunting, and relocation expenses.

In January a Wisconsin couple filed suit against Bunker Hill claiming that their four children had suffered permanent physical damage from emissions from Bunker Hill's lead smelter while they had lived in Smelterville. This case is similar to a 1981 suit that was settled out of court by the company for more than \$8 million, although the actual cost to the company

was reportedly \$1.6 million. Late in September the Pacific Indemnity Company claimed that it was under no obligation to cover the company's liabilities stemming from lead pollution lawsuits.

The Bunker Hill underground greenhouse was closed in May. In late May the company hired the children of laid-off workers to plant 120,000 seedlings on 300 acres of its land.

The year closed on a hopeful note for the future of Bunker Hill and the people of Kellogg when it was announced on November 1, 1982, that all of the assets of the Bunker Hill Company in Idaho had been purchased by a team of four Idaho businessmen who were instrumental in earlier buy-out attempts. Duane Hagadone, Harry F. Magnuson, and Jack Simplot, three of the original investors active in January, were joined by former Bunker Hill president Jack Kendrick. Each of the first three men has a 28-1/3 percent interest and Kendrick has a 15 percent interest in the new company that is now called Bunker Limited Partnership. The old Bunker Hill Company is now the Pintlar Corporation (a subsidiary of Gulf Resources) that is handling the complex details of the sale.

The new owners announced that increases in metal prices and an improved economy were necessary before the mines and surface plants could reopen; however, many Kellogg residents were hopeful that at least some of the 2,100 jobs lost during the year might be restored. The labor union's role in the new company is unknown.

The buyers reportedly paid \$15 million for the property, including \$5.6 million in cash and the rest in notes against the company's assets. This contrasts with the purchase offer in January reportedly of \$65 million, \$44 million in cash and notes and \$20 million in production notes. Gulf Resources reduced the company's value to \$29 million by taking out liquid assets, receivables, and inventories, and further reduced the value to \$15 million in its second quarter report. The new owners also assumed some \$10 million in liabilities. Repairs and materials necessary to reopen the company's surface plants and mines could cost another \$25 million.

*Hecla Mining Company.* At the company's annual meeting Hecla announced that it was the number one silver producer in the nation in 1981, having mined approximately 15 percent of total U. S. production. The company also expanded authorized shares of common stock from 20 million shares

to 30 million and adopted an incentive stock option plan for company officers and key employees.

On June 6 the economic recession and low metal prices forced Hecla to declare a temporary wage and salary reduction for about 300 workers. Employees earning less than \$17,000 were cut back 5 percent, company directors and executives were cut 15 percent, and all others were cut 10 percent. Hourly wages of employees at the Lucky Friday mine were not affected due to a labor union contract, but incentive contract rates of Lucky Friday miners were reduced by 15 percent. About 290 people are employed at the Lucky Friday. The 170 workers at the Star mine had already been cut 10 percent to reduce costs.

The major event for the company during the year was the closure of the Star mine, the deepest lead-zinc mine in the United States, on June 8. Hecla announced in mid-April that the Star was entering a mine-out phase that might take from two months to two years. The closure cost about 350 jobs. By June the work force at the mine had been reduced to about 170 people. The Star had lost \$2.3 million in the first five months of 1982. According to Hecla's annual report, the Star produced 483,014 ounces of silver, 6,410 tons of lead, and 6,844 tons of zinc from 126,472 tons of ore in 1982 prior to the shutdown.

The Star mine is owned 50 percent by Hecla and 50 percent by Bunker Limited Partnership, successor to the Bunker Hill Company. Hecla is the operator. Concentrates from the Star mill were processed at the Bunker Hill lead smelter and zinc plant until Bunker Hill ceased operations in the autumn of 1981. Then the Star zinc concentrate was shipped to the Cominco smelter at Trail, British Columbia, Canada. Lead concentrate was shipped to the Asarco smelter at East Helena, Montana. The last concentrate shipment from the mine was on June 25. The pumps on the 8100 level were turned off on September 7 and the mine started to flood. All machinery was removed for salvage. The salvage operation was completed in October. The mine still contained mineralized veins--the deepest mineralization was exposed on the 8100 level--but costs of deep mining and the relatively low silver credit of the Star deposit made further production uneconomical.

In mid-January Hecla curtailed production at the \$12 million Consolidated Silver project at the former Silver Summit mine near Osburn.

This cost fifty-four jobs, and in late February twenty-three more were laid off. Work continued on deep-level shaft sinking, although the effort was reduced to a single shift. The shaft was at the 5400 level by year's end, and should be completed to the 5525 level by mid-1983. A four-year exploration project will be conducted on the 5324 level.

Hecla has a 64 percent interest in the venture put together in 1980 to search for ore 1,300 feet below the lowest level of the former Silver Summit mine. Hecla also owns 50.08 percent of Consolidated Silver Corporation common stock. The 100-ton-per-day operation yielded 27,584 tons of ore in 1981, averaging 12.2 ounces per ton silver and 0.3 percent copper. Prior to shutdown in 1982, the mine produced 1,272 tons of ore yielding 18,698 ounces of silver and 3 tons of copper.

The company settled a long series of lawsuits when it paid the Atlas Mining Company \$200,000 for subsurface rights to any ore in the North Atlas property adjacent to the Lucky Friday mine. As part of the agreement, Hecla will conduct a 30-month, \$1.3 million program at the South Atlas property under a 25-year lease. Work started in the fall on the project that consists of rehabilitating the main Atlas tunnel and then drifting westerly toward the Boulder Creek vein system. A pair of three-man crews were at work on the project.

Full production continued at the Lucky Friday mine throughout the year. The new "Silver Shaft" at the mine passed the one-mile mark on May 5 and was 5,800 feet deep at year's end. The first production level will be at the 4900-foot level, and stations will be blasted at 200-foot intervals below that level. The shaft will go to 6,200 feet during this phase of construction, and eventually to 7,700 feet. J. S. Redpath Corporation, the shaft contractor, plans to reach the 6200 level in May 1983. Started in 1980, the project is more than 40 weeks ahead of schedule. Production from the new shaft will begin when the 6200 level is reached and should result in a 35 percent increase in ore production. The shaft is serviced by a Nordberg hoist with two 12-foot drums that measure 8 feet across their face. Two 1,500-horsepower motors drive the hoist that was placed in service in early 1982.

According to Hecla's annual report, "A combination of increased ore tonnage and a higher silver content produced the record 3.84 million ounces of silver. The previous high of 3.70 million ounces was reached

in 1962. Production in 1982 of 211,000 tons of ore was exceeded only by 1971 production of 213,000 tons. This represents a 42% increase from the 149,000 tons produced in 1981 when the mine was closed for nine weeks by a labor strike." The final production figures for 1982 are 3,841,793 ounces of silver, 20,145 tons of lead, 2,069 tons of zinc, 666 tons of copper, and 1,857 ounces of gold from 210,876 tons of ore.

Hecla received a favorable decision from the First District Court in December 1981 concerning its claim to a portion of the ore mined from the Syndicate-Chester vein system at the Sunshine mine. Hecla stands to gain by the ruling more than \$1 million from the Sunshine Mining Company, which has appealed the lower court decision to the Idaho Supreme Court.

In July, Hecla commemorated the recent merger back in October 1981 of Day Mines into Hecla with a 1-ounce silver medallion. The entire 25,000-coin issue was sold by the end of September. Hecla-Day, an interim subsidiary that resulted from the merger, was integrated into Hecla, and all company activities are now under the name of the Hecla Mining Company.

Company interests outside of Idaho also reflected the recession. All work at the Sherman mine at Leadville, Colorado, was suspended in June, and that property and the Victoria Unit in Nevada were placed on standby status. Exploration efforts continued at the Queen Florence Mining Company's property near Neihart, Cascade County, Montana, with encouraging results.

The closure of the Sunshine mine in June affected company earnings, since Hecla receives 33 $\frac{1}{4}$  percent of the production from the Sunshine Unit area which accounts for about 75 percent of the Sunshine mine production. Hecla continued to receive 12 $\frac{1}{2}$  percent of the profits from the Galena mine and 5 percent of the profits from the Coeur mine, both of which operated all year. The company's Knob Hill mine at Republic, Washington, also maintained gold-silver production during 1982.

Hecla donated two petrologic microscopes to the University of Idaho's College of Mines and Earth Resources in honor of Dr. George Williams, who stepped down during the year as head of the Geology Department in the college.

*Sunshine Mining Company.* The Sunshine Mining Company tightened its belt in the face of the recession and low metal prices. The company

reported a \$5.6 million loss for the first half of 1982, and was forced to temporarily close the Sunshine mine on Big Creek. All was not bad news, as the company brought into production the new Sixteen-to-One mine in Nevada.

The closure of the Sunshine mine was forecast in January when the company reduced its work force at the mine by 24 people. The number of layoffs increased to 35 in February, and to 43 in March. Company officials suspended operations at the mine on June 12, laying off approximately 450 workers. Some hourly employees were retained to mothball the big mine. In July, 23 salaried employees (25 percent of the salaried work force) were laid off. Only 80 full-time and part-time salaried employees were working in August, and pay cuts ranging from 5 to 15 percent were in effect. Executive salaries were cut by 20 percent. Only 12 hourly employees remained while closure of the mine was completed. By November a skeleton crew of only 37 employees was working at the mine site.

The company announced on November 9 that the Sunshine mine would reopen due to increases in the price of silver. About 250 of the 450 men laid off were notified in late November that work at the big silver mine would resume in December. The company plans to reach full production and call back an additional 220 laid-off employees by February 1983.

Prior to the closure, sinking was completed on the No. 12 shaft in March. This shaft bottomed at 5,235 feet. The project, started in 1970, cost approximately \$19.5 million. Work continued on the Copper Vein drift that will connect the 5000 level of the No. 12 shaft to the No. 10 shaft and allow for more efficient production from the Copper Vein between the 4800 and 5000 levels. Other work in the mine included reopening the 3400 level and repairing the No. 4 shaft. Preparations were also made to open a new sandtank on the 3100 level adjacent to the No. 10 shaft, and the hoist in the Jewell shaft was overhauled. The rockburst monitoring system was improved, and a new gas monitoring system was installed to measure air quality in the mine. The company's 1982 annual report notes that the Sunshine mine produced 2,352,586 ounces of silver, 410 tons of copper, and 316 tons of antimony from 104,824 tons of ore.

A part of the company's new refinery on Big Creek was placed in operation during the year. The first 1,000-ounce silver bar was poured in April. The refinery is producing 90,000 ounces of silver and 800 ounces of gold per month from doré (a mixture of gold and silver) shipped from the Sixteen-to-One mine in Nevada. Total production for the year was 587,111 ounces of silver and 3,973 ounces of gold. When completed, the plant will have a capacity of 10 million ounces of silver per year. The new refinery will make Sunshine independent of outside smelters and refiners, and it is a major goal in the company's efforts to become independent as a silver producer and refiner.

Sunshine's annual stockholders meeting was held on May 14 at Tonopah, Nevada, when the Sixteen-to-One mine at Silver Peak, Nevada, was formally opened. The \$22.8 million installation includes a 500-ton-per-day mill and concentrator. A vat-leach cyanide process yields the doré. The new mine will have an annual production of 1.2 million ounces of silver and 4,000 ounces of gold.

The company began marketing its new 1-ounce silver "Sunshines" and 10-ounce bars early in the year. The rounds and bars are produced by Sunshine Bullion Company, a joint venture of the Sunshine Mining Company and Metal Arts Company of New York. A 100-ounce bar was added later in the year. The company hopes to make the "Sunshine" the standard for silver investors much as South Africa's Krugerrand is to gold.

Other company projects included exploration in the Ambler River district in Alaska and completion of a headframe at the Burgin mine in the East Tintic district in Utah. As a result of last year's merger with four smaller companies, Sunshine now holds a 24 percent interest in Consolidated Silver Corporation that is exploring the Silver Summit mine near Osburn. Encouraging mineralization was reported from drill holes near Mullan on property held by the Allied Silver-Lead Corporation.

Asarco. In spite of the difficult economic times, Asarco continued with full production from the Galena mine (operated by Asarco on a lease from Callahan Mining Corporation) and the Coeur mine (leased from Coeur d'Alene Mines Corporation). With the closure of the Star mine, the Sunshine mine, and the Bunker Hill complex, Asarco became the top employer in the district, with 230 employees at the Galena mine, 130 at the Coeur mine, and 26 at the company's office in Wallace. Asarco's



Coeur d'Alene operations were a bright spot, as its other operations worldwide were curtailed or closed due to the recession and low metal prices.

According to Callahan Mining Company's annual report, production increased 3 percent at the Galena mine, from 196,500 tons in 1981 to 201,877 tons in 1982. Asarco gives production from the mine at 3,801,000 ounces of silver, 1,320 tons of copper, and 492 ounces of gold. The Galena shaft was deepened during the year to 5,230 feet, and a new station excavated at the 5200 level.

The Coeur mine improved its average silver grade for the fourth consecutive year. According to Asarco's annual report, the mine produced 2,481,567 ounces of silver, 1,200 tons of copper, and 276 ounces of gold from 134,863 tons of ore. A shaft station was installed at the newly opened 1300 level and preparations made to develop silver veins at this level. According to Coeur d'Alene Mines Corporation's annual report, ore grade per ton of ore mined increased 17 percent to 18.4 ounces of silver per ton compared with 15.8 ounces per ton in 1981 and 15 ounces per ton in 1980. Ore reserves will allow at least 7½ years of normal production.

The \$3.5 million exploration project conducted by Asarco on property adjacent to the Coeur mine owned by the American Silver Mining Company was placed on standby in June pending better economic conditions. An access tunnel about 3,000 feet long was driven from the 3400 level of the Coeur mine and a drilling program was started. A siderite vein was crossed in the tunnel, but there were no reports of silver mineralization, the main target of the program. Several diamond drill holes were completed prior to the suspension. More than \$1.2 million has been expended on the project. Partners in the venture include Coeur d'Alene Mines Corporation, Callahan Mining Company, and Hecla Mining Company.

Asarco won a major tax case that has had a drastic impact on Idaho's state tax revenues. Idaho and other states had taxed corporations on the basis of their total domestic and international income based on the percentages of the company's business done in the state. Asarco claimed it should only be taxed on income from its Idaho operations. The case was finally decided by the U. S. Supreme Court in favor of Asarco. The court refused to hear an appeal in the case. This decision cost Idaho

\$5-6 million annually in tax revenue and forced Governor Evans to order a 1½ percent holdback in current state budgets. Over \$10 million in previous tax payments will have to be refunded by the state over the next several years.

*Coeur d'Alene Mines Corporation.* Coeur Explorations, the exploration arm of Coeur d'Alene Mines Corporation, conducted an \$830,000 exploration program on properties where it has operating agreements. These projects comprise large areas of previously unexplored land in the "Silver Belt" and north of the Osburn fault. Coeur d'Alene Mines is also a joint venture partner in the Consolidated Silver project operated by Hecla, and it owns the Coeur mine operated by Asarco.

Nine diamond drill holes totaling 4,210 feet were completed at the CAMP project, a joint venture between Coeur d'Alene Mines, Merger Mines Corporation, and Plainview Mining Company. This work has mainly explored the Polaris fault zone between the Silver Summit mine and the Coeur d'Alene mine, both of which have had notable production records.

Surface mapping, soil sampling, geophysical work, and 2,500 feet of diamond drilling continued to probe Royal Apex Silver's Harlow property located two miles north of the Osburn fault. Work continues on this interesting property to delineate zones of mineralization and to correlate lithology and structure with known mineralization. Coeur d'Alene Mines owns 49.8 percent of Royal Apex Silver's common shares.

Preliminary reconnaissance mapping and follow-up geochemical soil sampling were conducted during the year on Capitol Silver Mines' property adjacent to the Harlow project. A diamond drill hole was drilled into a promising zone. Evaluation of results is continuing to delineate more diamond drill targets.

Detailed surface mapping and geochemical sampling were performed on Highland Aurora Mining Company's property, and the geology and data are being evaluated in anticipation of diamond drilling of the extensive Highland Aurora vein.

Consistent with the company's plans for expansion, a new exploration office was opened at Sparks, Nevada.

*Callahan Mining Corporation.* The owner of the Galena mine, like other companies, was forced to reduce or curtail some operations during the year. The Galena mine was a bright spot for the company as it

receives 50 percent of the cash flow from the operation. Callahan also gets 4.8 percent of the profits from the Coeur mine.

The Caladay project continued all year, but funding was reduced by \$100,000 per month in midyear. A total of \$4.3 million was expended on the project during 1982. This allowed for about 100 feet of shaft sinking per month. The shaft reached 3,000 feet in October. A pump station and diamond drilling station were cut at this level. The shaft will eventually reach 5,100 feet at a final cost of \$26.6 million. Since 1980, \$12.9 million has been spent on the project. The shaft is located at the end of a 5,000-foot tunnel. The tunnel, main station, and hoist room were completed in 1971, but further work ceased until shaft sinking and hoist installation started in 1980. The shaft work is being done by *Wallace Diamond Drill*. This exploration/development project is about 1½ miles southeast of the Galena mine at the east end of the "Silver Belt." Partners in the project include Hecla Mining Company with 12 percent interest and Asarco with 5.3 percent.

In October, Callahan and Hecla Mining Company signed a lease agreement for the Hornsilver and Peerless claim groups that adjoin the south and east boundaries of the Caladay project area. Callahan holds a 70 percent interest in the claims, and Hecla will receive 30 percent of any profits after capital costs are paid. The ground will eventually be explored from the Caladay shaft. Callahan will continue exclusive funding of the Caladay project.

#### Other Coeur d'Alene Mining Operations

*Bear Creek Mining Company* (a subsidiary of Kennecott Corporation) completed option agreements in late January with nine small mining companies located between the Idaho-Montana border and Placer Creek east of the "Silver Belt." The companies are Idora Silver Mines, Inc.; Beacon Light Mining Company; Silver Crest Mines, Inc.; Shoshone Silver Mining Company; Reindeer Queen Mining Company; Park Copper and Gold Mining Company; Border Silver Mines Company (since merged with Silver Crest); Helena Silver Mines, Inc.; and Idaho Copper.

In the fall, Bear Creek signed lessee agreements on 541 more claims owned by eight more companies: Placer Creek Mining Company; Silver Buckle Mines, Inc.; Amazon Dixie Mining Company; Boulder Creek Mining

Company; Stevens Peak Mines, Inc.; Flojodo Mines, Inc.; Lake Gulch Silver Mines, Inc.; Superior Silver Mines, Inc; and South Atlas Mines, Inc. On September 8, Bear Creek assigned its entire interest in the above claims to *Anaconda Minerals Company*. The total land package consists of over 25,000 acres and extends from south of the Caladay property to the Idaho-Montana line. It constitutes one of the largest land packages ever put together for exploration purposes in the Coeur d'Alene district. Anaconda is required to spend at least \$120,000 on the properties during the first year and must increase the amount yearly, leading to \$220,000 in the fifth year and \$665,000 in the tenth year. The company can cancel any of the leases at any time.

Anaconda started work soon after assuming Bear Creek's interest. A shallow hole started by Bear Creek on the Silver Crest property was completed by fall. Anaconda drilled two more holes at Stevens Peak late in the year before heavy snow shut down the drilling program. The venture is a "wildcat" undertaking as the vast area contains many signs of mineralization and a few small mines and prospects, but has had no significant production. In late November an agreement was signed with Silver Shadow Mines, Inc., which has claims in the area of interest to Anaconda.

*Burke Mining Company* signed an exploration agreement with Pacific Coast Mines, Inc. (a subsidiary of U. S. Borax), covering 197 claims located north of the Snowstorm-National copper belt. Pacific will spend \$75,000 the first year, \$150,000 the second year, and \$200,000 in the following three years. Burke will receive 35 percent of any net profits from the venture after preproduction investments are repaid. A drilling program was underway in August.

*Champion Gold and Silver, Inc.*, reached a similar 10-year agreement with Pacific Coast Mines, Inc., on 171 claims north of the Sunset-Monitor mine area and on the 51-claim Calumet group that is surrounded by Burke Mining Company's claims. Pacific is believed to be exploring for stratabound copper-silver deposits similar to the Troy Project in Montana, recently placed in operation by Asarco.

*Helena Silver Mines, Inc.*, conducted an exploration program on its claims in the Dobson Pass area. The claims are east of Capitol Silver's claims and west of the Dayrock mine.

In January, *Cominco American, Inc.*, entered a long-term lease agreement with Mascot Silver-Lead Mines, Inc. The lease covers the Little Pittsburgh mine, one of the larger zinc-lead producers on Pine Creek. Nabob Silver-Lead Company also signed an agreement with Cominco in April, covering 187 claims on the East Fork of Pine Creek. The Nabob mill, under lease to Intermountain Minerals Engineers, Inc., was not affected by the arrangement. With the completion of these arrangements, Cominco now has options on many properties in the Pine Creek area. The company is reportedly looking for stratabound lead-zinc mineralization similar to the huge Sullivan mine owned by Cominco in British Columbia, Canada.

*Idaho Gold Fields* announced a one-year lease with Intermountain Minerals Engineers, Inc. (IME), for operation of the Golden Dream mine located six miles northeast of Murray. Any ore from the mine will be shipped to IME's Nabob mill on Pine Creek that is leased from Mascot Silver-Lead Mines, Inc.

*Trans-Atlantic Pacific, Inc.*, negotiated a 25-year mine management contract with Golden Chest, Inc., to manage one of Idaho's oldest gold properties, the Golden Chest mine, near Murray. Investors include the Vikings Investment Corporation, a group of players from the Minnesota Vikings football team. The property consists of 33 patented lode and placer claims and 9 unpatented claims. Some placer gold was reportedly recovered from the Butte Creek area in October. The placer work was being done by two sublessees.

*Silver Surprise, Inc.*, initiated court action seeking more than \$3 million from the Sunshine Mining Company. The case involves ore mined from the Yankee Girl vein from 1950 to 1961. The State Supreme Court has ruled that Sunshine was liable and referred to a lower court for settlement of the amount of money owed to Silver Surprise. Surprise is seeking \$602,645 immediately, the amount it claims Sunshine has admitted owing.

A different type of "silver" mining operation started early in the year when mine tours of the Sierra Silver mine near Wallace commenced. The program is under the direction of the *Wallace Mining Museum*, which also receives the proceeds from the tours. The mine is also used as a classroom for mining students from Wallace High School. The underground

tours are conducted by the school's mining instructor and others versed in the world of hard-rock mining. The tours are reportedly a great success and a boon to the area's tourist trade.

#### Other Mining Operations in the State

Substantial progress was made at the site of what will be the largest open pit mining operation in the state's history, the Cyprus Thompson Creek project. Work continued throughout the year despite drastically lower prices and a sluggish market for molybdenum. *Amoco Minerals, Inc.* (a subsidiary of Standard Oil of Indiana) is the owner/operator of the massive project.

Throughout the winter months about 370 company employees worked at the site. Amoco crews used four P & H 2300, 25-yard shovels and a fleet of twenty-two 170-ton Wabco trucks to move 180,000 tons of waste rock daily. More than 130 million tons of overburden will be removed before ore is mined in mid-1983.

In May Amoco signed construction contracts with the Industrial Company of Steamboat Springs, Colorado. Industrial hired 350 workers for this project, including many from the Challis area. Other contractors at the site included Industrial Contractors Corporation, Missoula, Montana; S & W Construction of Salt Lake City, Utah; Cyprus Specialty Steel Company of Phoenix, Arizona; Southwestern Materials Supplier Company of Englewood, Colorado; and Treasure Valley Concrete, Inc., of Boise, Idaho. Amoco planned to spend in 1982 \$100 million of the \$360 million budgeted for the entire project. Over \$300 million has already been invested in the project.

When mining operations start in October 1983, the huge trucks will haul ore from the open pit to a gyratory crusher that will grind the ore to less than 9 inches in diameter. The ground ore will then be transported via a 60-inch-wide, 7,300-foot-long conveyor belt that will lift the ore 600 feet to the concentrator. The concentrator will handle 25,000 tons of ore and produce 50 tons of  $\text{MoS}_2$  concentrate per day. Testing of the concentrator plant will start in July 1983. Concentrates may then be trucked to the railhead at Mackay or Arco. The 200-million-ton orebody, which grades 0.18  $\text{MoS}_2$ , contains enough "moly" to last 20 years at the planned mining schedule. When the orebody is mined out, over 700 million

tons of rock will have been removed from an open pit measuring over 1 mile across and 2,350 feet deep on the high wall.

The mine will employ about 550 people when in operation, for an annual payroll of more than \$9 million. Many of the mine employees and their families will live in the 262 new homes built by the company in Challis. The company also maintains a 162-unit mobile home park in the town. As part of Amoco's plan to help alleviate the impact of its operation on Challis and Custer County, the company is prepaying taxes. This year \$1.1 million in prepaid taxes is going toward construction of a new high school in Challis. Amoco employed a total of 450 people by October. Seventy-nine percent of this work force was from Idaho and 59 percent of the workers were from Custer County. The company's concern for the environment is exemplary, and they have posted over \$2.5 million in reclamation bonds. The operation is inspected periodically by a task force of six state and federal agencies that work closely with the company to insure environmental quality.

The Amoco Foundation donated \$2,000 to the College of Mines and Earth Resources at the University of Idaho.

The DeLamar mine, located in Owyhee County in southwest Idaho, continued with full production throughout the year. The open-pit silver-gold mine is owned 52½ percent by *Mapco Minerals Corporation* and 47½ percent by Superior Oil Company. In September Mapco announced it was interested in selling its interest in the profitable operation. The estimated value of Mapco's interest was \$15-20 million. Companies that submitted bids included Sunshine Mining Company, Callahan Mining Company, Nerco Mining Company, and Houston Oil and Minerals. In October Mapco decided to keep its interest in the property and rejected all bids.

Mine production for the first nine months of 1982 was 1,288,000 ounces of silver and 15,800 ounces of gold. Ore was mined from the Sommercamp and North DeLamar pits, and a new pit, the Glen Silver, was placed in operation. The mine is one of the lowest cost open-pit ventures in the country. The company employs 175 people at the remote mine site and the closed cyanide leach system mill.

*Clayton Silver Mines'* operation near Clayton in east-central Idaho fell prey to low metal prices and was forced to close down in June. Thirty-five employees were laid off and all supervisors' and company

officers' salaries were reduced by 10 percent. In 1981 the mine produced 103,600 ounces of silver, 666,660 pounds of lead, and 34,620 pounds of copper from 55,258 tons of ore. The 1982 production was 55,900 ounces of silver, 431,830 pounds of lead, and 18,250 pounds of copper. During the lay-off several improvements were made, including replacing the 140-ton-per-day ball mill with a 250-ton-per-day unit and installing a new powerline. Geologic mapping and diamond drilling continued during the shutdown. The mine was reopened on December 20 and employment was at full strength. Production was averaging 220 tons per day over a six-day work week at year's end.

Construction on five leach pads was completed during the year at the Stibnite heap leach operation of *Superior Oil Company* located in Valley County. The pads measure 250 by 325 feet apiece and hold 25,000 to 30,000 tons of ore per pad. Plans call for leaching 30,000 tons per month per pad for a five-month season that is limited by severe winter weather. The company leached 200,000 tons this year during a short season due to construction and start-up efforts.

Two to three thousand tons of oxidized ore is mined from the West End open pit (owned 25 percent by TRV Minerals) and hauled to a crusher and then to the pads each day. Activated carbon towers are used to remove gold and silver from the pregnant cyanide leach solution. Reserves at the operation are estimated at 2.5 million tons of ore averaging .085 ounce of gold per ton.

*Western Construction* from Boise is the main contractor handling all mining operations. The smooth construction and start-up operations are largely due to Western's excellent efforts, according to Superior's spokesmen. Western employs approximately 80 people at the site, and Superior has about 20 employees. Reclamation of the tailings pile left over from previous operations is a major part of Superior's environmental planning. A dike will be built across the front of the pile and the tailings will then be buried. The old tailings have been a source of concern because flooding could easily cause contamination of the East Fork of the South Fork of the Salmon River.

A new 100-foot adit was completed in the Center Star gold mine near Elk City. The new adit cut several veins carrying gold values. In October, *Center Star Mines, Inc.*, reached an agreement with the Midas



Group to rehabilitate the old Center Star mill. All equipment for the new mill had been delivered and 600 tons of ore stockpiled by late October. Ore was mined at 25 tons per day, and initial mill capacity will be 50 tons per day.

*Sunbeam Mining Company* did little new work at its pilot heap-leach cyanide gold operation on Sunbeam Mountain above Jordan Creek in Custer County. The company was awaiting results of an environmental analysis by the U. S. Forest Service and was reportedly seeking new capital for the project. The mining operation will employ 50 people when it gets underway. A watchman at the site pumped water containing cyanide from a sealed pond to an unsealed pond this spring, fearing that snowmelt would cause the sealed pond to overflow. The unlined pond leaked and caused concern, although the cyanide solution was subsequently neutralized and no damage resulted. The spill prompted the Idaho Conservation League to request that the leach pad be moved off the hillside to a safer site.

In June *Circa, Inc.*, a Utah corporation, purchased the leasehold interest in the Blackstone mine southwest of Fairfield, and a 28.75 percent interest in the Banner mine northeast of Idaho City from *Silver Chief Mining Company* of Boise. Stock acquired in the deal gives Silver Chief an 80 percent interest in Circa. The Blackstone mine is an open pit copper-silver mine in a quartz-porphyry dike complex. There was some production from the mine last year. The property reportedly has reserves of 250,000 tons of 12-ounce silver and 4 percent copper. Near Mountain Home Circa started construction of a \$50,000 mill that was placed in operation in December. The mill will employ 15 people. The Blackstone mine was reopened and initial shipments from a 10,000-ton ore stockpile mined last year were made to the millsite. The company plans to mine about 3,500 tons of new ore by year's end. The Banner mine is an underground silver mine in which Silver Chief invested \$1 million in an exploration and development program in 1980. There was no new work at the Banner by Circa this year.

*Big Turtle Mines, Inc.*, did assessment work at the Big Turtle mine in Custer County. The mine was explored and drilled last year. The company was active in the Castle Creek area of Owyhee County and started an exploration program on its claims in this area. The company also maintained the Big Hole property in the Boise Basin area.

In January *Canadian Superior Mining (U. S.), Ltd.*, a subsidiary of Superior Oil Company, dropped a purchase option agreement on the Sunnyside mine (91 claims) in the Thunder Mountain district in central Idaho. Several companies immediately scrambled to pick up the option. Superior had completed a 57-hole drilling program in 1981 with encouraging results. In April a new agreement was signed by *Thunder Mountain Gold, Inc.*, the owner of the Sunnyside, and by *Phillips Petroleum*. The agreement provides for a 30 percent royalty on net proceeds and a minimum annual payment of \$125,000, escalating with any increase in the price of gold over \$400 per ounce. Thunder Mountain obtained options early in the year on 65 more claims adjacent to the Sunnyside mine property, including the Bullion and "L" groups. Last year's drilling program indicated interesting gold value on these claims which are included in the Phillips agreement.

*Scott-Yellowjacket Mining Corporation* of Vancouver, Washington, continued work on Crooked Creek, a tributary to Big Creek, at the Snowshoe mine. Last year the company built a bunkhouse on the property, and this year planned to build two bridges over Big Creek and do some shaft work. The mine lies 15 miles inside the "River of No Return Wilderness Area." The project has been approved by local U. S. Forest Service officials and is awaiting approval by the regional office.

*James Collard* planned to build a 2.2-mile road for exploration and development of the Golden Bear claims in the Little Ramey Ridge district, 5 miles from the Big Creek road. The U. S. Bureau of Mines described the claim in the Idaho Primitive Area study as having good gold and silver values.

Due to the soft market for barite in 1982, *Cash Industries, Inc.*, stopped processing barite stockpiled at the Bonnie Barite mine near Hailey in July. The company's mill at Ketchum was converted from barite to a 300-ton-per-day precious metals plant. The company then used the mill to process ore from their Champagne mine located between Arco and Carey. Production was about 100 tons per day. The mill also operated as a custom mill for several small precious metal mines in the area. At full production the plant employs 35 to 45 people.

*Ayerock Petroleum, Ltd.*, of Vancouver, British Columbia, and *Key Properties, Ltd.*, with *Key Milling Company* of San Francisco announced a

joint venture to open the Berg, Monarca, and Ida Belle mines north of Silver City in Owyhee County. The property covers about 10,000 acres. Ore from the mines will be shipped to the Keyrock mill near Riggins. The vat leach cyanide mill was upgraded to a capacity of 100 tons per day during the year.

*Dennison Mines (U. S.), Inc.*, cut back on plans for its Idaho properties due to the recession. The company closed its Spokane office, as part of the economic belt tightening, and announced that a joint venture partner would participate in exploring the Hoodoo district in Latah County and the Parker Mountain area in Lemhi County. Dennison had an active program at both sites last year and plans to start a drilling program in 1983. The company also obtained an option on the Allison gold mine above the Ramshorn Ranch east of Myers Cove.

*Yankee Fork Silver and Gold Company* (U. S. Antimony Corporation) operated its 300-ton-per-day mill at Preachers Cove on the Yankee Fork all last year and plans to do the same this year. The company is mining ore in underground operations on Mt. Estes and at the Charles Dickens mine. Last year the company processed the dumps from these mines. In 1982, the company patented an open pit at the old Bonanza mine near Custer. A new vat leach cyanide mill near the concentrating plant was constructed and tested. Ore and dump material from the Mt. Estes mine will be processed in the new plant.

*Noranda Mining, Inc.*, maintained its large claim block at the Blackbird mine in Lemhi County. A dramatic fall in the price of cobalt in 1981 forced the company to curtail plans for opening the Blackbird, the country's most readily available source of this strategic mineral. Noranda continued an exploration program in the special management zone of the "River of No Return Wilderness Area." The U. S. Geological Survey began studying the special management zone to evaluate the area's potential for cobalt and other minerals.

*Noranda Exploration* did some trenching and assessment work at Red Mountain, north and west of Stanley. The site was drilled last year for molybdenum. Company geologists were also active in north Idaho, exploring for possible Coeur d'Alene-type or Sullivan-type ore deposits in rocks of the Belt Supergroup.

*American Copper and Nickel Company* will drop its claims on Knapp Creek in Custer County. The claim block, bordering the "River of No Return Wilderness Area," was drilled last year for uranium.

The Missouri mine in the Boise Basin did not operate during the year because of low metal prices. *Mobile Energy and Mining* did some geologic mapping and sampling at the property. The Overlook mine and Morning Star mine adjacent to the Missouri were examined, and the entire property will be further evaluated and drilled next year. Last year the Missouri mine and mill employed 34 people.

Other mines with some activity in the Boise Basin area included the Silver Bar mine near the Banner mine north and east of Idaho City, the King mine, and the Weatherby mine.

*Inspiration Development Company* was hard hit by the poor metals market and closed its Spokane office. The company had two of the most promising prospects in the state under evaluation in 1980 and 1981, one at the Bayhorse mine near Bayhorse and the other at the Ima mine near Patterson. Early in the year the company started a 14-by-16-foot development drift at the Ima that was 150 feet long when all work on the property stopped. No new work was done at the Bayhorse mine during 1982.

*Cominco American* drilled the sixth diamond drill hole (600-700 feet) at the Bobcat Gulch prospect on Napoleon Ridge east of Leesburg. The hole intersected a 30-foot chalcocite enrichment blanket (.92 percent copper) and then passed into a chalcopyrite zone. The company is reportedly interested in selling the property or in discussing a joint venture on the porphyry copper-molybdenum prospect.

*Shoshone Silver Mining Company* opened up and rehabilitated about 200 feet of old tunnel at the Idaho Lakeview mine in the Lakeview district near Pend Oreille Lake. A new leach circuit was installed at the 70- to 100-ton-per-day Weber mill. Mill feed will come from the Weber mine, the Keep Cool mine, and the Idaho Lakeview mine. The mines have a past production of gold, silver, lead, and zinc. Six men were employed this year at the property, and mining will resume when metal prices recover. Shoshone has an operating agreement with the Sunshine Mining Company on the Keep Cool and Idaho Lakeview mines.

*Rocky Mountain Energy* extended the adit to 800 feet at the Bartlett Creek uranium prospect on the North Fork of the Big Lost River. Three diamond drill holes were drilled inside the adit. The company reduced its efforts at the property later in the year due to the poor economic climate.

A 15-foot shaft and 50 feet of drift were developed at the Red Leaf mine, a lead-silver property near Clarendon Hot Springs west of Hailey. Four men were at work in the mine for part of the summer.

*Valley Chief Mining Company* did some surface sampling and geologic mapping at its property upriver from Graham on Bayhorse Creek. The company hopes to do some drilling next year.

Some work was done at the Concord mine in the Buffalo Hump area south of Grangeville. About 300 feet of shaft was cleared out and rehabilitated.

Ore was discovered in a new drift at the Batchelor mine on the Yankee Fork of the Salmon River. The operators planned to mine several thousand tons from the gold property this year.

*Galey Construction Company* opened up the tunnels at the Red Horse mine in the Little Smoky district and did some diamond drilling. Results were not encouraging, and the company plans to drop the property. Other mines with activity in the district included the King of the West mine and prospects near Carrietown.

A pilot test was run on 1,000 tons of ore at a heap-leach venture operated by the *Yellowjacket Mining Company* near the Yellowjacket mine in Lemhi County. The company is awaiting test results.

The Lone Pine mill near Elk City was being rehabilitated by *Havilah Mines*. The company did considerable work at the New York mine last year, and has slowed down operations this year due to the recession. Eleven men were employed at the millsite.

A geologic mapping and sampling program was initiated at the Talache mine near Atlanta that is under option to the *Yanke Machine Company*. About 600 feet of drift was reopened in the upper level of the mine, and 15 tons of high-grade ore was mined that averaged 20 ounces per ton gold and 80 ounces per ton silver. The company plans to continue exploration on the upper level of the mine and to do some core drilling next year.

There was little activity at the Dewey mine in the Thunder Mountain district this year. *Copper Lakes* is negotiating to buy out the property from Yanke Machine.

*Big Buffalo Mining Company* operated an 8-ton-per-day pilot mill at the Big Buffalo mine (south of Elk City) in the Buffalo Hump district. About 1,000 tons of ore mined last year was run through the mill. The mine is an open-pit operation on a 30- to 40-foot-wide vein. The operation employed 3 to 4 men and will continue at this scale next year as testing proceeds.

*Anglo Bomarc* drilled six holes at the Hercules silver property 6 miles southeast of Brownlee Dam in Washington County. One of this year's drill holes reportedly had a 100-foot intercept of 3-4 ounce silver. The property reverted back to Anglo Bomarc this year, and results have been so encouraging at the property that the company plans to continue efforts next year.

*Atlantis Mining Company* built a small mill in Colorado Gulch 4 miles south of Hailey. The mill will process ore from the Magdalena mine.

Mines with some activity in the Warren area include the Vaux mine on War Eagle Mountain, the Silver Eagle mine near Pony Creek, the Rescue mine south of Warren, and the Robinson Dyke mine. There was also some activity in the Marshall Mountain district.

Approximately 6,000 tons of ore was shipped from the Silver Strand mine near Lakeview in Bonner County. The ore was stockpiled in 1981. Some underground repair work and percussion drilling were done during the summer.

*Texasgulf* drilled two holes on Windy Ridge, located south of Kleinschmidt Grade in Adams County. The company also continued with exploration at the Red Ledge mine.

Activity was reported at the Democrat mine near Leadore. An exploration program was conducted on the Silvermoon claims, and plans call for development in 1983.

#### Placer Gold Operations

Numerous placer operations in the state ranged from small hobby-type suction dredges to serious mining efforts using heavy equipment. There were 649 stream alteration permits issued by the Idaho Department

of Water Resources, indicating that recreational gold dredging continues to be a popular pastime in the state.

Idaho prospectors staged a "mini" gold rush in October when the U. S. Forest Service opened for mining a 22-mile stretch of the Salmon River from Long Tom Bar to Riggins. This part of the river was withdrawn from mineral entry in 1973 when it was recommended for inclusion in the Wild and Scenic River System. There were sixty-five claims filed in one day on the approximately 2,500 acres, and two placer operations were underway by the end of the opening day.

*Napias Mining Company* operated a placer mine near Leesburg during the summer and fall. The company uses an 18-ton trommel, Jig and Diester tables, and sluices to recover the gold. Over \$750,000 has been invested in the operation located in one of Idaho's oldest gold-producing areas.

*Molycorp, Inc.*, examined placer claims near Elk City, not for gold, but for rare earths as contained in the mineral xenotime that occurs in black sands in Idaho. The company operates the country's largest rare earth mining operation at Mountain Pass, California, and is interested in looking at other rare earth placers in Idaho.

*Clairmont Mines, Inc.*, received state approval for what could become a major gold placer operation in Warren Meadows, north and east of McCall. The company plans to test about 10 acres, but the project could eventually encompass 2,400 acres and employ as many as 120 people. The company may use a large suction dredge that can operate to a depth of 65 feet. Gravel in Warren Meadows may be as much as 190 feet thick, based on a seismic survey.

*Secesh Basin Mines, Ltd.*, continued construction and assembling equipment at its placer in Warren Meadows. A second dragline was assembled this summer. A 4,000-square-foot building was erected to house recovery equipment. The project employed 10-15 people and was operating at about 60 yards per hour late in the summer.

The *Scientific Mining Corporation* stripped an area on the East Fork of Eagle Creek in Shoshone County and plans to operate at 60 yards per hour next year.

Other placer gold operations in the state included the following:

<u>Company</u>	<u>Number of Workers</u>	<u>Size (yards per hour)</u>	<u>County</u>
Green Mountain Mineral Trust*	5	30	Boise
Roeder Mining, Inc.	2	30	Owyhee
Lyman Andrews	3	15	Elmore
Robert E. Johnson	4	40	Elmore
Miller Mining Company	3	25	Elmore
Robert Horn	2	50	Idaho
Strategic Mineral Investment, Inc.*	2	10	Idaho
A and T Mining*	3	25	Idaho
Shellco Mines, Inc.*	3	sampling	Lemhi
EME Company	3	10	Boise
Grouse Creek Placer Mining, Ltd.*	--	--	Idaho
Red Fox Mining, Ltd.*	3-5	40	Idaho
R and W Mining	3	25	Idaho
Idaho Rand Company*	6	35	Lemhi

\*scheduled to start production in 1983, preliminary work this year.

#### NONMETALLIC MINERALS

##### Phosphate

Because of the continuing soft markets and full inventories in Idaho's phosphate industry, analysts estimated a major reduction in output for 1982 over the previous year. Industry spokesmen believe there will be little expansion in the next few years. If Chevron continues with plans to build a new phosphate plant near Rock Springs, Wyoming, recovery in Idaho will take even longer. Phosphate is a major ingredient in agricultural fertilizers, and elemental phosphorus has a wide variety of applications in industrial and food products. Idaho's phosphate operations, located in the southeastern corner of the state, usually account for 10 to 12 percent of the phosphate produced in the United States.

*J. R. Simplot Company* laid off in August forty-three of the 216 workers at its Conda mine near Soda Springs. The company had layoffs earlier in the year, and 35 employees were laid off in April at Simplot's fertilizer plant near Pocatello.



Simplot continued developing the new \$35 million Smoky Canyon mine located 25 miles east of Soda Springs. The mine site is on a federal lease, and the operation will eventually cover about 1,300 acres. A road was completed to the site, and the right-of-way was laid out for the 8-inch slurry pipeline that will transport beneficiated phosphate ore from the mine to the company's plant at Conda. The 25-mile-long pipeline will be completed in 1983. A mill site adjacent to the federal lease was cleared in the fall of 1982. Topsoil has been stockpiled for reclamation. Construction of an 8-mile powerline from Afton, Wyoming, is nearly complete. Calcined phosphate from the Conda plant will be shipped via rail to Simplot's Sim-Cal Chemical Company in Fresno, California, that was acquired in 1980 for the manufacture of fertilizer.

At full production, 2 million tons of phosphate ore per year will be moved from the open pit mine using electric shovels and 170-ton haul trucks. Simplot will employ about 100 people at the site, and 75 of these will be transferred from the Conda mine that is being phased out and will be replaced by Smoky Canyon. The Conda mine was developed in the 1920's by the Anaconda Company and was sold to Simplot in 1960. Many of the workers at Smoky Canyon will live in Afton, Wyoming, the closest town to the mine site. The new mine has at least a 30-year lifetime.

A new flotation process that will enable Simplot to recover 10 to 15 percent more phosphate was installed at the company's Conda plant. The process was developed by metallurgists from the U. S. Bureau of Mines. The process will recover 80 to 90 percent of the phosphate that formerly went to the tailings pond as waste. The process may also enable lower-grade phosphate ores to be economically mined in the future. The new plant at the Conda facility can handle up to 100 tons of waste per hour. Simplot may use the process to upgrade low-grade ore piles and to rework some of its phosphate tailings stored at Conda.

Simplot signed an agreement with the Shoshone-Bannock tribes on the Fort Hall Indian Reservation giving hiring preference to qualified Indians at the Gay mine (leased by Simplot and FMC Corporation and operated by Simplot). In February, 12 workers were laid off at the Gay mine that has annually provided up to 2 million tons of ore for FMC's elemental phosphorus plant and 300,000 tons to Simplot's acid plant.

A suit brought by a southeastern Idaho rancher against Simplot and FMC Corporation went to trial in April. The rancher claims that fluoride emissions from the Simplot and FMC plants poisoned his cattle. The case attracted considerable interest in the Pocatello area.

The Maybe Canyon mine, owned by *Conda Partnership* (a joint venture of Beker Industries and Western Cooperative Fertilizer, Inc.), was closed in December 1981 due to the soft market for fertilizer and the oversupply of phosphate rock. The mine is operated for the Partnership by the *Washington Construction Company*. Some 500 union employees of Washington Construction accepted a wage freeze in January so that the mine could reopen. Beker informed Washington Construction in March that when the mine reopened there could be a drastic reduction in mine production during 1982 because Western Fertilizer had decided to close indefinitely its fertilizer plant in Alberta, Canada. Western's Canadian plants had formerly processed about half the output of the Maybe Canyon mine. Beker planned no reductions in its need for the other half of the Maybe Canyon production, which it processes at a plant near the mine site. Production resumed at the North Maybe Canyon in July. Conda Partnership's Champ lease (Federal lease 04979), located 5 miles south of the Maybe Canyon mine, was opened in September 1982. This lease will supply higher grade phosphate ore to blend with Maybe Canyon ores.

*Beker Industries* reopened its wet acid plant at Conda that had been closed for three months at the end of 1981 due to the high cost of natural gas purchased from the Intermountain Gas Company. Far more favorable gas rates were obtained in late December from the Southwest Gas Corporation, enabling the facility to reopen in January.

*FMC Corporation* announced that plans to build a 500-megawatt coal-fired generator at a cost of \$1.2 billion would be presented to potential investors in April. The company decided to look into building its own power plant when the Idaho Power Company decided to raise electrical rates for the company's elemental phosphorus plant near Pocatello by 67 percent in 1980. FMC noted that the plant had suffered about 20 power interruptions during 1981. The company is Idaho Power's largest customer, buying about 15 percent of its entire output. Plans for the new project were delayed at year's end as FMC was awaiting a new power-use project run that could alter the need for the new plant.

*Stauffer Chemical Company's* Wooley Valley mine, which supplies phosphate ore to the Silver Bow, Montana, elemental phosphorus plant, ceased operations in May 1982. Production is expected to resume in 1983.

*Monsanto* operated the Henry mine and its elemental phosphorus plant near Soda Springs. Possible plans by Idaho Power Company to end service to Monsanto's plant by 1986 were a concern to the company during the year.

*Kerr-McGee* processed vanadium at its extraction plant near Soda Springs, across the road from Monsanto's elemental phosphorus plant. Vanadium is extracted from the ferro-phosphorus slag that is a by-product of Monsanto's operation. *Kerr-McGee* employs about 50 people at the plant.

#### Other Industrial Rocks and Minerals

*Hess Pumice Products* continued to mine pumice from the Wright's Creek mine located 22 miles northwest of Malad. The company mined 13,800 tons of pumice during the year and employed two men at the mine and seven at the processing plant in Malad. Most of the product is used as a lightweight aggregate for construction-related items.

*Amcor* employed three men at its Fan Claim pumice mine near Idaho Falls. The pumice is used for the production of lightweight concrete blocks.

*Producers Pumice, Inc.*, mined pumice from its Rock Hollow open-pit operation near Idaho Falls. Two men were employed at the mine site.

*Oneida Perlite* added a second crusher and screen unit to its mining operation located 20 miles north of Malad in Oneida County. The company plant at Malad produces expanded perlite and is involved with all facets of the industrial perlite business. The operation employs 10 men. The company had a good year, considering the economy.

*Idaho Portland Cement Company* mined limestone from the quarry near its plant at Inkom in Bannock County. The company is the only portland cement producer in the state and employs three men at the mine and 52 at the plant.

*E. J. Wilson and Sons* mined gypsum and limestone from the Snowball quarry in Lemhi County.

*Emerald Creek Garnet Milling Company* continued the largest placer operation in the state. Garnet sand is dredged from Emerald and Carpenter Creeks and then sized and packaged at the company's plant near Fernwood. In the first nine months of 1982, 9,402 tons of finished garnet product was packaged. The garnet is used as an industrial abrasive and as a filtration medium. The company employs twelve people at the mine and eight people at the mill.

*A. P. Green Refractories Company* (a subsidiary of United States Gypsum Company) processed fire bricks at its plant at Troy in Latah County. The first six months of the year were good for business, but the second half of the year was poor. The company signed an order with Reynolds Aluminum in Portland, Oregon, for fire brick. When the aluminum industry recovers, this new outlet will amount to 50 percent of A. P. Green's business. The company hopes to get similar orders from other aluminum companies.

*Consumers Coop* sold 3,500 tons of gypsum in 1982, down from 5,900 tons in 1981. The Hansen Building Company crushes the gypsum and hauls it from the open-pit mine near Iron Mountain in Washington County. The Coop sells the gypsum for agricultural use in the Weiser area.

*Chromalloy Mining and Milling* reportedly drilled a barite prospect in Arbon Valley. The site is about 25 miles south of Pocatello on land leased from the Harde Mining Company.

*Meridian Land and Minerals Company*, a subsidiary of Burlington Northern, Inc., studied a potential industrial silica source on 2,000 acres of Forest Service land on the east side of Lake Pend Oreille near Green Mountain. The source of silica is the Gold Creek quartzite of Cambrian(?) age. The company would operate an open-pit mine and could possibly ship the high-grade silica across the lake by barge. Twenty-nine holes were drilled on the property to evaluate the deposit. The only current producer of silica in Idaho is Martin Marietta's operation near Emmett.

A patent application was made on three claims worked for precious opal on Mud Creek, a tributary to Monumental Creek. This one-man operation has been successful for several years in mining the opal that is valued by rockhounds. Precious opal was also mined on a fee basis by rockhounds at the Spencer opal mine in Clark County.

Building stone was quarried at several sites on the Snake River Plain. Slab basalt and quartzite were the most common type of rock sold. The center for stone production in Idaho is Oakley.

## OIL AND GAS

Oil and gas drilling and exploration came to a standstill by autumn as the world oil glut forced a curtailment of drilling throughout the country. Only three wells were completed during the year (Table 4), including Gascome Oils' Cottonwood No. 1-26 in Lewis County, Phillips Petroleum's Idaho State A No. 1 in Caribou County, and Exxon's Meyers Federal Unit No. 1 in Clark County. The Phillips well may have contained oil or gas.

Wells being drilled during the year included Amoco's Bald Mountain Federal No. 2 in Bonneville County, High Plateau Oil and Gas' High Plateau No. 1, and R and T Exploration's Joe Elliott No. 1. Amoco suspended drilling in June but decided by year's end to drill deeper.

An improvement in the economy and more stable oil prices were responsible for an increase in exploration interest by the end of the year. Several new wells were planned for 1983 including two by Sohio in Bear Lake County and one by Amoco (Milford Federal No. 19-1) in Lemhi County.

Northern Idaho was the scene of the latest oil and gas play as Arco announced that the 1 Paul Gibbs well would be drilled in Flathead County, Montana. The wildcat well will go through Precambrian units of the Belt Supergroup that are thrust over a structure formed of Paleozoic sediments. The Belt sediments east of Sandpoint were of interest. About 1.6 million acres were under lease or lease application in Benewah, Bonner, Boundary, Clearwater, Kootenai, and Shoshone counties. The State capitalized on the play and held an auction for oil and gas leases on state lands in the area.

Plans for the Northern Tier pipeline that would carry Alaskan oil from Port Angeles, Washington, to Clearbrook, Minnesota, were terminated in midyear. The project, initiated in 1975, proved highly controversial. A major concern was potential damage to the environment in the Puget Sound area by the underwater pipeline.

Table 4. Exploratory oil and gas wells in Idaho for 1982, compiled from Idaho Bureau of Mines and Geology Open-File Report 83-6, 1982-1983 Update to Map 4--Oil and Gas Exploration in Idaho.

Operator	Well Name	Location	County	Total Depth (Feet)	Status	Completion Date
Gascome Oils, Inc.	Cottonwood No. 1-26	NENE $\frac{1}{4}$ sec. 26, T. 34 N., R. 1 E.	Lewis	5,701	plugged and abandoned	1982
Phillips Petroleum Company	Idaho State A No. 1	NENE $\frac{1}{4}$ sec. 16, T. 6 S., R. 44 E.	Caribou	16,300	plugged and abandoned	1982
Exxon Corporation	Meyers Federal Unit No. 1	SWNE $\frac{1}{4}$ sec. 14, T. 14 N., R. 35 E.	Clark	18,540	plugged and abandoned	1982
High Plateau Oil and Gas	High Plateau No. 1	SENE $\frac{1}{4}$ sec. 26, T. 16 S., R. 37 E.	Oneida	drilling	drilling	1982
Amoco Production Company	Bald Mountain Federal No. 2	NWNE $\frac{1}{4}$ sec. 6, T. 4 S., R. 45 E.	Bonneville	drilling	drilling	1983
R and T Exploration	Joe Elliott No. 1	SENE $\frac{1}{4}$ sec. 34, T. 5 S., R. 8 E.	Elmore	drilling	drilling	1983

## OTHER DEVELOPMENTS

The governor of Idaho, John V. Evans, proclaimed October 9, 1982, as "Mining Day" to commemorate the contribution of the mining industry to the state.

The U. S. Bureau of Land Management started the evaluation of potential wilderness areas through the geology, energy, and minerals (GEM) resource appraisal program. Areas in southeast and southwest Idaho were under study.

All on-shore responsibilities of the Minerals Management Service (formerly part of the U. S. Geological Survey Conservation Branch) were transferred to the U. S. Bureau of Land Management. A new minerals group formed from the MMS will join the BLM office in Boise, Idaho. The office is under the direction of Bill R. LaVelle.

In October a minor earthquake, measuring 5.0 on the Richter scale, jarred an area 10 miles southeast of Soda Springs in southeast Idaho. There were no reported injuries or damage.

Seven high school students received scholarships and 35 students in college renewed grants from the Hecla-Bunker Hill Scholarship Fund. Total awards for the year were \$19,950. The fund has provided over \$224,000 for scholarships in mining engineering and related sciences since its inception in 1951.

Early in the year agreements were signed that initiated the Institute for Resource Management jointly at the University of Idaho and Washington State University. The novel program is designed to train resource managers in a wide spectrum of disciplines related to the environment and utilization of natural resources. The program was spearheaded by actor Robert Redford, who was instrumental in organizing and funding the institute.

The experimental Raft River geothermal plant near Raft River, Idaho, was shut down during the year by the U. S. Department of Energy, after it was decided that the plant could not economically produce electricity. Plans were made to sell the facility as no other agency was interested in taking over the project. The project, on 560 acres, was built to generate electricity from a low-temperature geothermal source utilizing isobutane-driven generators. The plant operated briefly,

producing 4.8 megawatts for a short time. Hot water was obtained from three 5,000-foot geothermal wells, and the cooled water was reinjected into two 4,000-foot wells. The project cost \$40 million to develop and build over a three-year period.

Remains of mammoths that roamed Idaho over 12,000 years ago were found near Dworshak Reservoir and a tributary of the Potlatch River. The bones and teeth were studied by the Idaho Bureau of Mines and Geology and the University of Idaho's Department of Anthropology.