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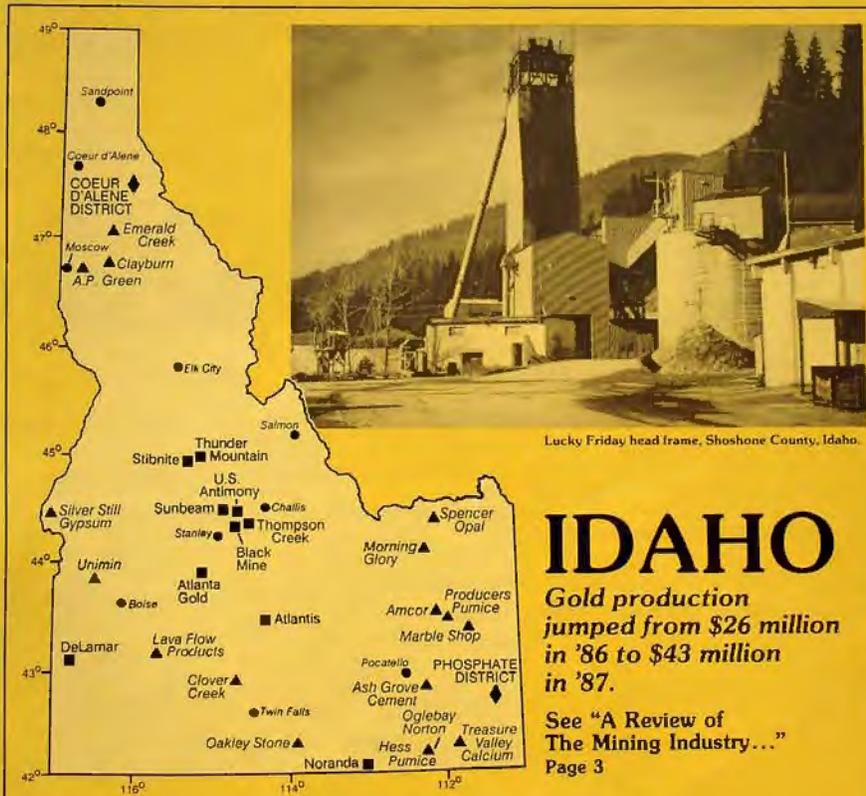
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Cover Story

A Review of the Mining Industry of Idaho in 1987

by Earl H. Bennett
and
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1987 saw the mineral sector in Idaho begin a slow but determined climb out of the economic doldrums that have depressed the industry nationwide for the past few years. Mines reopened in the Coeur d'Alene district, a closed phosphate plant came back on line, and the Thompson Creek molybdenum mine continued operating, although with reduced production. Bright spots included the first year of full production from two new gold mines, doubled exploration efforts for precious metals, and stable markets for the state's industrial rock and mineral producers.

In Idaho there are roughly five parts to the industry:

- Silver production from the Coeur d'Alene district
- Phosphate production from southeast Idaho
- Other operating mines (including Thompson Creek; gold-silver cyanide-leach operations at DeLamar, Stibnite, and Thunder Mountain; and a number of smaller producers)

- A variety of industrial rock and mineral producers
- Exploration and development

The value of non-fuel mineral production in Idaho in 1987 is estimated at \$258 million, compared to \$240 million in 1986 and \$348 million in 1985 (figures from U.S. Bureau of Mines). The increase in 1987 is because gold production jumped from \$26 million in '86 to \$43 million in '87. The importance of silver and phosphate is shown by the 1985 figures (the last year all mines were operating); \$115 million for silver and \$102 million for phosphate accounted for 62% of the year's dollar value. In 1987, silver value decreased to \$58 million and phosphate to \$62 million. Gold is becoming more important as new cyanide-leach operations come on line. There is no mineral-fuel production in Idaho.

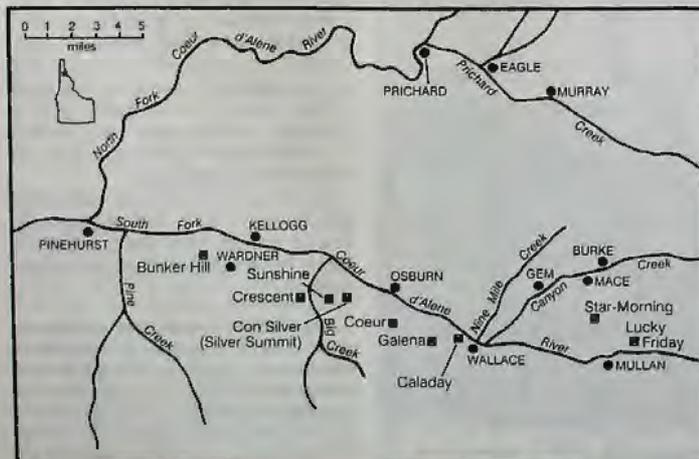
Coeur d'Alene District

Mines in the fabulous Coeur d'Alene district in north Idaho suffered a jolt in 1986 when the Crescent, Sunshine, and Lucky Friday mines closed because of low silver prices. Only the Galena and Coeur mines remained operating. Due to the closures, Idaho lost its title of No. 1 domestic silver

producer to Nevada. All mines reopened in 1987 and Idaho should regain its No. 1 position in 1988. The first mines in the Coeur d'Alene district were discovered in 1884. Since then, they have yielded over 1 billion ounces of silver, which is the largest recorded silver production in the world. Normally the district's mines produce about 15 to 16 million ounces of newly-mined silver a year, with the Galena, Lucky Friday, and Sunshine producing 4-5 million ounces each and the Coeur mine about 2.5 million ounces.

The Crescent mine, owned by the Bunker Limited Partnership, reopened for exploration and development work in October. A 10-man crew was recalled to sink the No. 2 shaft from the 5,100 ft. to 5,260 ft. level. The mine may go into production in 1988. Rumors in October indicated that Canarim Investment Corporation of Vancouver, B.C., was interested in reopening the huge Bunker Hill mine which closed in 1981. Canarim has put the plan on hold, awaiting settlement of several court cases concerning health benefits between 3,000 Bunker Hill pensioners, Gulf Resources (the former owner of the complex), and the Partnership.

Hecla Mining Company opened the Lucky Friday mine (closed April, 1986) in June without a contract with the United Steelworkers Union. Wages at the mine are now tied to the price of silver and to mine production. The company continued to develop the Lucky Friday Underhand Longwall (LFUL) mining method to replace the conventional cut-and-fill method used in all the district's mines. The new method will alleviate rock bursts. (Rock bursts are explosive rock failures that occur at the one-mile-plus operating depths of the district's mines. These bursts kill several miners yearly.) The new method fills worked-out stopes with concrete prepared at the surface in a new \$2½ million plant. The cement is piped 5,000 feet down the Silver shaft and pushed another 2,000 feet by the column's weight to fill the LFUL stopes. The system utilizes rubber-tired diesel equipment and spiral ramps. It will increase worker productivity substantially in addition to increasing safety. In another venture, Hecla and its partner, Coeur d'Alene Mines Corporation, wrote off the \$19 million Consolidated Silver exploration project at the Silver Summit mine.



citing disappointing results.

The Sunshine mine, closed in February of 1986, was reopened in December without a contract with the Steelworker's Union. Like Hecla, wages will be tied to silver prices and mine production. The "Shine" has produced over 300 million ounces of silver (compared to about 200 million at the fabled Comstock Lode in Nevada). The mine is probably the single largest silver mine in the world. Sunshine Mining Company operates its own antimony plant and silver refinery near the mine site and has its own mint in Coeur d'Alene. These facilities make Sunshine independent in mining, refining, and marketing silver.

Asarco continued full operations at the Galena mine (owned by Callahan Mining Corporation) and the Coeur mine (owned by Coeur d'Alene Mines Corporation). The company signed a new three-year contract with the Steelworkers Union in February,

marking 22 years of labor harmony at the Galena mine. The Galena has out-produced the Sunshine and Lucky Friday over the past 17 years due to its effective labor relations and efficient mining operations. Both the Coeur and Galena are testament to Asarco's worldwide reputation as a cost-effective operator.

Callahan Mining Corporation renewed exploration at the Caladay project and plans to spend an additional \$4 million in drifting and diamond drilling. The company is looking for veins similar to the silver veins in the Galena mine. Work will concentrate on the 4,900 ft. level, which will eventually connect to the Galena workings. Initial investment at the Caladay was \$27 million for shaft sinking and exploration.

Idaho produces about 10 percent of the nation's phosphate. Phosphoric acid for making agricultural fertilizers (J.R. Simplot and NuWest Industries),

and elemental phosphorous for use in fertilizer and finished products ranging from plastics to soda pop (FMC Corp. and Monsanto) are manufactured in Idaho. The phosphate is mined from open pit mines in the Permian Phosphoria Formation.

The agricultural fertilizer market remains soft due to the country's depressed farm economy. Exports of finished phosphate products are the "make or break" factor for the elemental phosphate producers in today's international phosphate business. FMC and Monsanto were helped by Department of Commerce rulings against phosphate "dumping" by other countries.

FMC, Simplot, and Monsanto made major investments in 1987. They installed air pollution equipment (mostly scrubbers on calcining and acid plants) to meet EPA air quality standards. Phosphate ore is calcined to remove water and organic matter.

NuWest Industries purchased the bankrupt Beker fertilizer operation at Conda for \$50 million in July. The plant was operating at about 70 percent capacity at year's end. The company gets ore from the Mountain Fuels lease in Dry Valley (mined under contract by Conda Mining Inc.). The nearby calcining plant is owned by the Conda Partnership (a joint venture between NuWest and the Western Cooperative Fertilizer Corporation of Calgary, Alberta, Canada).

The J.R. Simplot Company mines phosphate from its Smoky Canyon mine near the Idaho-Wyoming border and transports the slurried ore to Conda via a 27-mile pipeline. The company recently completed a \$50-million modernization and expansion project at its Pocatello fertilizer plant.

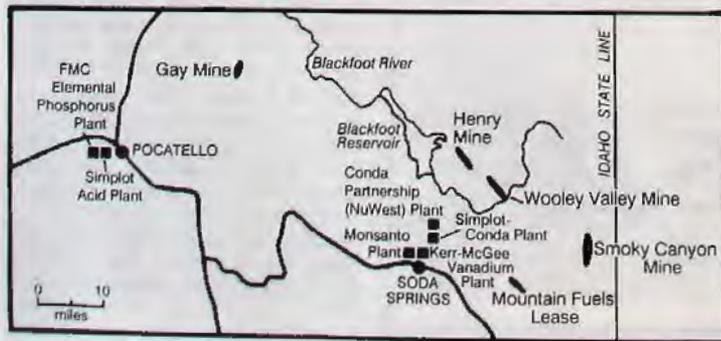
FMC Corporation operates the largest elemental phosphorous plant in the world at Pocatello. Ore is obtained from the Gay mine on the Fort Hall Indian Reservation. Simplot is the mining contractor.

Monsanto operates an elemental phosphorous plant at Soda Springs. Ore is mined from the company's Henry mine, operated by Dravo-Soda Springs.

Kerr McGee's vanadium extraction plant is located across the road from Monsanto's plant. Vanadium is obtained from ferrophosphorous slag, a byproduct of Monsanto's operation. Kerr McGee has developed several new vanadium products and plans on



Galena Mine, operated by Asarco. Largest silver producer in the district over the past 17 years. Shoshone County, Idaho.



expanding the Soda Springs operation.

Stauffer Chemical Corporation mines phosphate from the Wooley Valley mine. The raw ore is shipped to the company's elemental phosphorous plant at Silver Bow, Montana.

Other Mines in Idaho

Cyprus Minerals continued operating the open pit Thompson Creek molybdenum mine in central Idaho, but scaled back operations drastically due to flat moly prices. Employment fell from 350 people in January to 135 at year's end. Production plans were reduced from February 1987's rate of 7.5 million pounds of MoS_2 annually (40% of capacity) to an annual rate of 3.5 million pounds in December. The mill capacity is over 25,000 tons per day. Ore is transported from the pit to the mill via a 7,300 foot conveyor. The company was helped by favorable power rates from the Bonneville Power Administration and by a federal tariff on imported molybdenum from Chile.

Nerco Minerals, Inc., maintained full production at the DeLamar mine in southwest Idaho. The mine produces about 1.7 million ounces of silver and 28,000 ounces of gold annually. Ore from the open-pit mine is processed in a vat-leach plant. Nerco is finishing a new \$2.5 million heap-leach plant that will extract an estimated 1.4 million ounces of silver and 65,000 ounces of gold from stockpiled low-grade waste rock over a seven-year mine plan.

Pioneer Metals produced about 30,000 ounces of gold from a heap-leach plant at Stibnite. The company mines about 8,000 tons of ore per day from the West End mine during the summer months. The mine/mill is closed during the winter. Pioneer has entered into an agreement with Hecla to leach oxidized ore from the nearby Yellow Pine mine, owned by Hecla.

Coeur d'Alene Mines Corporation completed its first full year of production at the Sunnyside mine in the Thunder Mountain district in rugged central Idaho. The heap-leach mine yielded about 27,000 ounces of gold. The six- to eight-month operating season is limited by severe winter conditions at the mine's 7,888-foot elevation. The mine is owned by Thunder Mountain Gold Corporation. Until a few years ago, Coeur d'Alene Mines' only asset was the Coeur mine. Recently, the company has rapidly

expanded its interests to include Thunder Mountain, the Rochester silver mine in Nevada, and joint ventures with Echo Bay Mines in Alaska and in Central and South America.

U.S. Antimony Corporation has made a niche for itself centered on its 300 ton-per-day mill at Preacher's Cove on the Yankee Fork of the Salmon River. The company operates nearby mines on Estes Mountain and near Custer. This year it added the Valley Creek mine near Stanley and the Yellowjacket mine southwest of Salmon to the list. The company also custom mills for several small opera-

tors in the state.

In addition to these producing mines, there are a number of operations, such as the Black mine on the Yankee Fork, that ship a few thousand tons of ore per year. Usually there are a dozen or so placer-gold operations underway. The largest is AT and T Mining's placer located near Lucille.

Exploration and Development

Exploration interest in Idaho continues to boom as companies extend the search northwards for Nevada-style epithermal-gold deposits. With flow-through shares freeing their tra-



Cyprus' Thompson Creek molybdenum mine, Idaho's largest open pit operation. Custer County, Idaho.



Nerco Minerals' DeLamar Mine closed vat cyanide leach plant. Owyhee County, Idaho.

ditional sources of capital, more Canadian mining companies are venturing south of the border. There were 61 projects underway in 1987, ranging from announced mining plans to initial drilling programs. This is an increase from 38 in 1986.

Several companies have either announced new mine start-ups or are in an advanced stage of development:

- Atlanta Gold Corporation is looking at a heap-leach and/or conventional milling program at Atlanta Hill.
- Noranda has announced that a

heap-leach operation will start in the Black Pine district in 1988.

- Nevox plans to begin a heap-leach mine at the Robinson Dyke mine south of Elk City.

- Glamis Gold and Amir Mines have constructed a test heap-leach pad at the Buffalo Gulch property near Elk City.

- Sunbeam Mining Corporation plans to start construction on a vat-leach gold mine on Jordan Creek in Custer County.

- Atlantis Gold Corporation intends to build a mill near Bellevue to process

ore from the Atlantis mine.

The exploration boom in Idaho is driven by the new techniques of extracting gold and silver with cyanide in conventional or heap leach operations. The expanding use of cyanide has alarmed citizens, environmental groups, and government officials. Idaho's mining industry has taken the lead in facing this growing concern. A task force composed of industry, government, and conservation groups drafted the first modern regulations in the United States governing the use of cyanide in mining operations. The rules are designed to safeguard against accidents when using cyanide, especially in heap-leach operations. They will go into effect in 1988 and will be administered by the Idaho Department of Health and Welfare. Many states are expected to adopt variations of these rules. Idaho's industry leaders understand that it is far better to help write needed regulations than to fight bad legislation after it has been promulgated by some government agency or mandated by the courts.

Industrial Rocks and Minerals

Idaho is richly endowed with a variety of industrial rocks and minerals. We have a number of sole-source producers including: the Ash-Grove cement plant at Inkom; Unimin Corporation's silica plant located at Emmett; the Marble shop at Idaho Falls, that cuts and polishes travertine facing stone; A.P. Green's refractory brick plant at Troy; Silver Still's gypsum operation near Weiser; and American Diatomite's new Clover Creek diatomite mine near Gooding. Clayburn industries ships calcined clay from deposits near Deary to its Canadian operations. Emerald Creek Garnet is the largest garnet operation in the country. It produced a record 23,000 tons of finished garnet product in 1987. The company obtains garnet from the beds of Emerald and Carpenter Creeks and is the largest placer operation in Idaho.

Hess Pumice processed pumice at its new \$1.5 million plant at Malad. Oglebay Norton purchased the Oneida Perlite operation at Malad, and is modernizing the plant and increasing production. The world-class deposit mined by Oglebay and Hess is reportedly the largest perlite/pumice deposit in North America.



Coeur d'Alene Mines Corporation's Sunnyside Mine, elevation 7,888 feet. Valley County, Idaho.



Emerald Creek Garnet's mining operation. Largest garnet producer in the United States. Latah County, Idaho.

Other pumice producers in the state include Amcor and Producers Pumice. Both use the material as light-weight aggregate in cement products.

Oakley building stone is now shipped all over the country. Four firms actively mine and market facing stone quarried from a Precambrian quartzite south of Oakley. S and O Stone also sells facing and flagging stone from a quartzite quarry near Thompson Creek, and Lava Flow Products sells stone and scoria quarried from the Snake River Plain basalts.

E.J. Wilson and Sons (Morning Glory mine) and Treasure Valley Calcium process lime for animal feed supplements and other agricultural uses. Tourists enjoy digging for opal at the world-famous Spencer Opal deposit. They may also look for star garnets, the state gem, near Emerald Creek at fee sites administered by the U.S. Forest Service.

A number of sand and gravel producers and crushed stone quarries round out the industrial rocks and minerals story for Idaho. □

Commission to Review Seabed Mining Proposals

Washington, D.C.—A commission to review proposed ocean seabed mining offshore from the Hawaiian Islands was recently approved by the Senate Appropriations Committee. Sen. Daniel Inouye, D-Hawaii, proposed the establishment of the commission after dropping an attempt to impose a one year suspension on a Federal program to study exploratory mineral leasing in the Exclusive Economic Zone (EEZ) offshore of the islands. The commission will review proposed rules for seabed mining and ensure that the concerns of the State of Hawaii are addressed in the environmental review of four possible mining sites, located between 50 and 200 miles away from the Island of Hawaii.

The bill, as approved by the Senate Committee, also contains \$1.2 million to operate a Marine Mineral Technology Center at the University of Hawaii's Manoa Campus. The center will help in determining whether seabed mining in the Pacific can be done in a way that is environmentally sound. □

Miners and Mines Played Large Role in Early Arizona History

by Richard E. Wilbur

Tucson, Arizona—The miner was the scout of civilization in the early days of the West. And by the time the Arizona Territory was formed in 1863, miners and prospectors comprised almost one-fourth of the population.

Even the location and construction of most roads depended on where gold and silver mining communities were located.

Investors in mining operations were all over the territory, and businessmen often diversified into the mining field. Michael Goldwater, a merchant, is said to have operated—for one month in 1865—a mill he built at Wickenburg to process what miners dug up. Reports were that he made \$3,000 a day before he sold the mill.

Tombstone, with 10,000 residents thriving on silver mining between 1882 and 1884, was larger than San Francisco and probably just as cultural.

Today, there are 89 mining operations in Arizona. When the territory became a state in 1912, there were 445 active mines. In the same year, it produced more copper than any other state, a record repeated annually in

good times and bad ever since.

Those are a fraction of the recollections presented during an unusual all-day symposium titled "History of Mining in Arizona" on January 24th in Phoenix. The session was the kickoff event for the 117th annual meeting of the national Society of Mining Engineers.

Historical aspects of Ajo, the long-time mining community where Phelps Dodge Corp. shut down its copper operation several years ago, were included in several papers written by symposium speakers.

In 1854, the first copper mine in Arizona was established near Ajo, 110 miles west of Tucson, by the Arizona Mining and Trading Co. One of the company's organizers was Frederick A. Ronstadt, Sr., grandfather of Edward and Gilbert Ronstadt, who operated a hardware store in downtown Tucson for many years.

Where in the world did the name "Ajo" come from? Long before copper was mined in the area, ancestors of the Tohono O'odham Indians mined it for hematite, a mineral which they used for paint.

Their word for paint was "au, auho", which probably was pronounced "Ajo" by Spanish prospectors who

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