

EXPLORATION IN IDAHO — 1996

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Idaho Geological Survey

Production data for 1996 show that Idaho set another new record of 347,471 troy ounces of gold poured last year. This surpasses the 1995 mark of 300,023 ounces reported in last year's article. Leading the pack was Meridian Gold's new Beartrack mine in Lemhi County with 108,630 ounces of gold recovered. The company changed its name back from FMC Gold after being spun off from FMC earlier in the year. Opened in 1991, Pegasus Gold Corporation's Black Pine mine, which poured over 87,000 ounces, continued mining the C/D pit and NE Tolman pit, another exploration success, as the Cassia County operation started planning for closure in 1997. Hecla Mining Company's Grouse Creek mine recovered over 76,000 ounces of gold and announced that it also will be shutting down in 1997 after mining of the Sunbeam Pit is completed. Kinross Gold was mining gold and silver from both the DeLamar mine and the newly opened, adjacent Stone Cabin mine in Owyhee County. Seasonal operations continued at Dakota Mining's Stibnite property in Valley County, US Antimony's Yellowjacket mine in Lemhi County and CSC Mining's Rescue mine in Warren. Thompson Creek Mining was at full

production at the giant Thompson Creek molybdenum mine near Challis. Exploration projects (Figure 1) in Idaho were principally targeting precious metals, but cobalt, base metals, and phosphate also attracted interest.

Coeur d'Alene District and north Idaho

Mining and exploration work in the famous Silver Valley was encouraged by good lead prices and moderate silver prices.

Sunshine Mining and Refining operated their Sunshine mine flagship all year. They planned to double production and add 60 miners as a result of their West Chance discovery.

Hecla Mining Company mined silver and lead at the Lucky Friday mine and drilled from the new 4900 level drift of the Friday out to the Gold Hunter exploration project, located 4000 feet north. Vein intercepts were high grade (21 oz/ton), metallurgy was good, and Hecla estimated potential for as much as a 50 million ounce silver resource. The expansion project is located below the workings of the old Gold Hunter silver-lead mine.

Silver Valley Resources, a joint venture of ASARCO and Coeur d'Alene Mines, did exploration work at the Galena mine, which it hopes to reopen soon. New computer-aided exploration models have resulted in the discovery of several new ore zones.

Elsewhere in the District, Mine Systems Design was working a small gold vein and Silver Trend Mining was taking bulk samples at the Silver Strand mine on the Little North Fork of the Coeur d'Alene River. The end of an era happened on May 26, 1996, when the stacks of the Bunker Hill smelter and zinc plant were razed. Built in 1976, the smelter stack was 715 feet tall and a local landmark. Environmental remediation efforts were hampered by March floods which washed out some of the channel restoration projects.

Exploration activity returned to the Elk City area as Idaho Consolidated Metals Corporation (ICMC) picked up the Buffalo Gulch deposit near Elk City in Idaho County. The deposit was explored and permitted by Idaho Gold Corporation, a subsidiary of Bema, Inc., around 1990, but never developed. ICMC is looking at reactivating the permits for the heap leach gold deposit. They drilled 10 holes and explored additional deposits in the region.

Cyprus Amax joint ventured the Petzite property in the Orogrande Shear Zone west of Elk City from ICMC. Cyprus Amax conducted an extensive soil sampling program and drilled 16 reverse circulation holes at Petzite. Hole PZ-4 intersected a thick mineralized interval from 105 ft. to 500 ft. (EOH) grading 0.02 oz/ton gold with the lower 70 ft. somewhat higher. The Orogrande Shear projects through the Friday deposit, where

Bema drilled out a 2 million ton reserve, and continues north through Buffalo Gulch and other deposits.

Salmon Area

The new Meridian Gold Company operated the Beartrack heap leach gold deposit at Leesburg in Lemhi County. Their first year of full production yielded 108,630 ounces, meeting the mine plan. Geologists were busy with two reverse circulation and three core rigs that drilled over 40,000 feet to explore and delineate reserves between the North and South pits, along the Panther Creek Fault.

U.S. Antimony was driving a drift below the Yellowjacket open pit gold mine southwest of Salmon. Past work by the USGS suggested the exploration target.

Two projects changed ownership without any substantive work. Newmont turned the intriguing Musgrove project back to Atlas Precious Metals, who staked the gold mineralized system in 1991. Atlas mapped and drilled the property before selling Musgrove and the Grassy Mountain project in Oregon to Newmont in 1992. International Gold Resources, the parent company of American Gold Resources (AGR) was bought by Ashanti Goldfields, an African gold mining company. Their U.S. properties, including the Ditch Creek deposit and Arnett Creek project, were up for sale. AGR's work had outlined a reserve of 18.6

t (600,000 oz) of gold in sheared phyllites and intrusives at Ditch Creek. Arnett Creek, just southwest of the Beartrack mine, has over 200 drillholes.

Cominco American pursued base metal targets in the Proterozoic sediments of the Salmon region. They drilled a core hole at the reacquired Iron Creek copper-cobalt show and also at the nearby Twin Peaks property.

Formation Capital Corporation again had one of the larger efforts in the state at their Sunshine Project in the Blackbird Mining District. The target is syngenetic cobalt-copper-gold mineralization, similar to that on the adjoining Blackbird mine, where a major EPA-lead remediation effort is underway on Noranda's patented claims. Cobalt spot prices over \$20 per pound in late fall kept the Formation crews hopeful.

Formation's 1995 drilling included 67 holes for 32,745 feet of core on the Sunshine project and compilation of the large volume of historic mine information. Those results outlined a reserve of 147,719 tons, grading 0.9% Co, 0.5% Cu, and 0.023 opt Au, with a potential resource of a half million tons on the Sunshine property. The 1996 program included 21,000 feet of Phase I core drilling on the Sunshine zone (6 holes), East Sunshine (20 holes), and Northfield (3 holes) target zones. Formation was collecting engineering as well as geological data from the core.

Formation also had an active and successful target generation effort on the Sunshine Project. Crews collected 10,000 soil samples, ran geophysical surveys, and mapped and sampled the large acreage property. Several surface shows of cobaltite were found, and five new cobalt zones were identified: the Ram, Fiji, Lodge Pole, Camp, and Bedroom Shaft.

Formation also holds claims on four other copper-cobalt properties. One of those is Salmon Canyon Copper, located on the northwest end of the Cobalt Belt in metamorphosed strata.

Double Creek Mining optioned, mapped and sampled the property, which was drilled in 1980 by Inspiration Mining. The mineralized horizon, where exposed in the back of an adit, assays 0.3% cobalt, 3 % copper and 0.1 opt gold. Double Creek's drill permit was delayed by the untimely death of fisheries biologist Richard Konapecky, who drowned in the Snake River while working on another project. Double Creek did drill one deep core hole late in the year.

BHP Minerals picked up claims in the Leadore District in southern Lemhi County. They did geologic work and plan to drill next year on what is rumored to be a porphyry target.

West Central Idaho

USMX filed a Notice of Intent to Operate with federal and state agencies to permit a seasonal, heap leach, open pit gold

mine at the Dewey mine property in the Thunder Mountain District east of Stibnite in Valley County. Plans call for processing 5.3 million tons of ore over 5-6 years. Yearly production would be approximately 40,000 ounces gold and 80,000 ounces of silver.

The strip ratio is 1/1 on the mostly patented property. Processing facilities would be located on the flat, reclaimed ridgetop used by Coeur d'Alene Mines for their nearby Sunnyside and Lightning Peak mines, which operated from 1981-1990.

Water quality monitoring, fisheries studies and geotechnical investigations, including drilling for waste dump construction, were ongoing during the year. USMX is the first company to start out using Idaho's Joint Review Process for mine permitting. The process attempts to coordinate and facilitate federal and state permit activities. USMX has drilled 44,000 feet on the property, where ore is hosted in Eocene-age volcanoclastic sediments.

Dakota Mining Company, operator at the Stibnite mine, and Hecla Mining Company signed a letter of intent to jointly develop a refractory sulfide gold deposit at the Stibnite District. The resource contains about 20 million tons grading 0.09 ounces of gold per ton for a total of 1.8 million ounces. Dakota operates an oxide heap leach at Stibnite and recovers about 30,000 ounces annually. Permitting continued by Dakota on five additional targets in the Stibnite District. The Cinnamid

deposit was trenched, mapped and sampled in early summer. Dakota's geologists implemented a fall program with 30,000 feet of core and reverse circulation drilling on the Broken Hill deposit and other targets in the Stibnite District.

In the Big Creek drainage in Valley County, American Industries did a test run on their gravity mill and was stockpiling ore. The small company was having trouble finding miners who want to spend a summer in the gorgeous Idaho backcountry.

At Warren, CSC Mining continued to work on ore block definition at the underground Rescue mine. Gold is mined and milled from a high grade quartz vein. The company was also looking at other targets in the District.

East Central and south central Idaho

Curator American intersected stratabound zinc mineralization in one of their six 1995 drillholes on the DSA property near Bear Peak off the North Fork of the Big Lost River in Custer County. Mineralization is part of a Paleozoic black shale basin. Exploration in the area started in 1981. However, difficult logistics and strident objections of a local environmental group, the Boulder-White Cloud Coalition, finally scuttled the project. Curator reclaimed the drillsites and roads and dropped the claims.

Biomyne persisted with their exploration efforts and drilled one hole near Rooks Creek west of Ketchum. The company has had an active gold program in the area for several years.

Aurtex, an affiliated company, did work in the Vienna District north of Ketchum.

Cambior Exploration's Sultana project is located just outside the small ranching town of Mackay in Custer County. Cambior acquired the ground in 1994 and conducted surface work in 1995. Drilling with two core rigs was slow going, but encouraging results kept the drills active until the end of the year. Some 22 holes were completed. Oxidized skarn with Cu-Fe-Au mineralization surrounds a granite porphyry at the old Empire Copper mine. The lengthy skarn zone is located on 95% private ground in the White Knob Mountains. Drill intercepts were in the range of 1/2% copper over tens of meters with significant gold credits. Cambior planned to restart drilling early in the spring.

Ownership of the Atlanta project in Elmore County changed hands again when Ramrod Gold was taken over by Quest International Resources Corporation. Quest announced plans to conduct a feasibility study on mining the million ounce gold and 2.5 million ounce silver resource outlined on 2678 acres near the town of Atlanta northeast of Boise. The project has been drilled by Atlanta Gold, with help from Newmont, during

the past ten years. Quest was working on the feasibility and deciding on a possible mine scenario during the second half of the year. Some type of open pit, heap leach scenario is envisioned.

Boise Basin and southern Idaho

Cactus West maintained its claims on the giant Cumo molybdenum property on upper Grimes Creek in the Boise Basin.

The large, low-grade molybdenum deposit was discovered and drilled by Amax in the 1970s.

In southwestern Idaho, Golconda explored the VAR claims at the Consolidated Mercury prospect in Washington County. Precious metal mineralization is hot spring related. The company drilled 6000 feet of reverse circulation. Results enlarged the zone of gold mineralization and encountered some high grade intervals.

East of Weiser, International Freegold joint ventured the Idaho Almaden mine property from ICAN Minerals. The old mercury mine hosts a large tonnage (30 million tons), low grade gold resource with difficult metallurgy. Amax drilled and did feasibility studies on the property from 1991 to 1994. In 1996, International Freegold excavated test pits and drilled on private ground at the Idaho Almaden.

In Owyhee County Kinross Gold was shifting production from

the DeLamar mine, which started open pit operations in 1977, to their new Stone Cabin mine opened in late 1995. Gold-silver ore from the new operation is trucked seven miles west to the DeLamar countercurrent, vat leach mill, where a Knelson Centrifugal Concentrator was installed into the mill's grinding circuit to aid gold recovery from the Stone Cabin ores. Two pits, the Tip Top and Stone Cabin, were in operation during 1996, the first full year of a planned 7-year mine life. Kinross' operations contributed over 40,000 ounces of gold to the state's production.

On the eastern side of Idaho, a major company drilled for base metals in Butte County, and Echo Bay Exploration had another active year drilling on the Kilgore project in Clark County.

The young, epithermal precious metal system was initially drilled by Bear Creek in 1983. Echo Bay joint ventured the project from Placer Dome in 1994. Since Echo Bay took over two years ago, they have drilled 110 holes with no new roads built. 1995 drilling totalled 31,000 feet of core and reverse circulation. The Phase III program from January to September, 1996, involved 16,000 feet of core and 11,000 feet of reverse circulation rotary. The core drilling is all helicopter-supported, and old drill pads, even in talus, are totally restored. The company received the Idaho Land Board's exploration project reclamation award for their efforts.

Industrial Minerals

The largest mineral industry in the state is the phosphate industry, located in southeastern Idaho. The four Idaho phosphate mines, FMC's Dry Valley mine, Simplot's Smoky Canyon mine, Rhone-Poulenc's Rasmussen Ridge, and Monsanto's Enoch Valley mine, extract over 6.5 million tons of ore a year. Value of the ore and processing, conducted at Soda Springs and Pocatello, was estimated at over \$ 660 million for 1995. This contributed to a total value of over a billion dollars for Idaho's mineral production. Mines and plants, including Kerr-McGee's vanadium extraction plant and Agrium's fertilizer plant which processes ore mined by Rhone-Poulenc, were at full capacity.

At least two companies did exploration drilling as well, and the federal agencies continued working on the Environmental Impact Statement for two new proposed lease areas.

Rhone-Poulenc won the state's soft rock reclamation award for efforts at Rasmussen Ridge, and Monsanto helped out the dwindling population of Western big-eared bats by building an artificial bat cave at a reclaimed portion of their mine.

Aggregate demand continued strong due to an active construction industry fueled by rapid growth, particularly in the urban areas. Ash Grove Cement and dimension stone quarries also saw an increase in sales. In Malad, Hess Pumice opened

a second grinding plant, designed exclusively for their special low heavy mineral, fine pumice used for polishing television screens. Products from the new \$ 3 million facility, opened in April, are exported to many countries. Also in Malad, the National Perlite Products plant and mine of Ogleby-Norton was bought by Idaho Minerals Inc. , a subsidiary of Moneta Porcupine Mines, Inc. of Timmins, Ontario. Idaho Minerals planned to build a new, modern facility near Virginia to better access rail transport. In Valley County, Golconda retained an interest in the state's only diamond exploration project. The company collected some bulk samples of the bedded fragmentals at the project site near McCall.

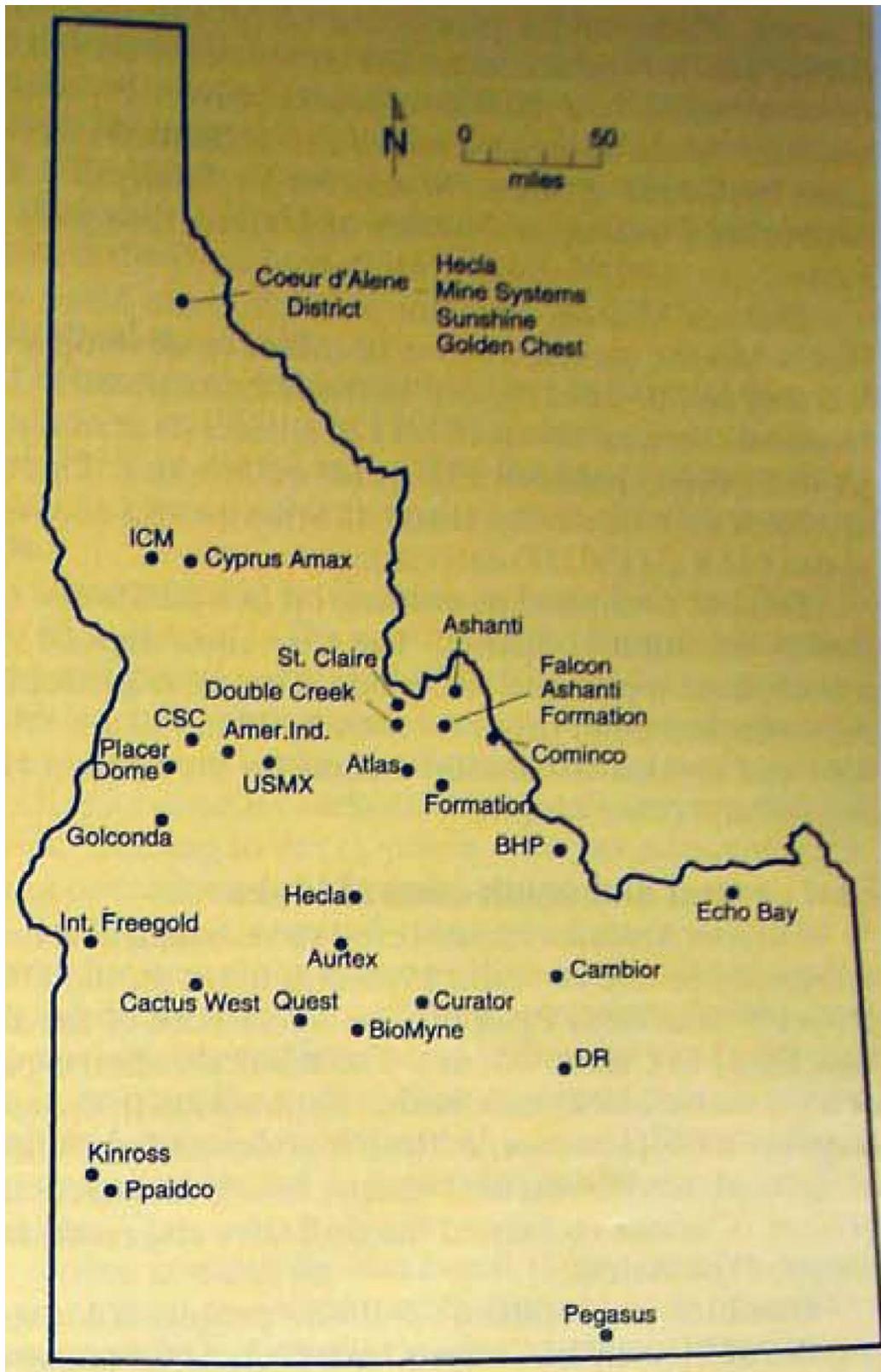


Figure 1: Exploration activity in Idaho during 1996.