Public-data File 88-8

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Alaska Division of
Geological and Geophysical Surveys
and
Alaska Division of Business Development

February 1988

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This document briefly highlights the activities of the Alaskan mineral industry during 1987. The staff of the Alaska Division of Geological and Geophysical Surveys and Alaska Division of Business Development has completed a more comprehensive summary that will be presented in mid-1988 in DGGS Special Report 41, 'Alaska's Mineral Industry - 1987.'

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C.B. Green[1] and T.K. Bundtzen[2]

There were positive changes in several sectors of Alaska's mineral industry in 1987. Expenditures and values for exploration, development, and production totaled $317.9 million, up from $231.7 million in 1986, an increase of 37 percent (table 1). The number of people employed in various aspects of the industry increased from 2,950 in 1986 to 3,299 in 1987---up 349 jobs. Principal mineral commodities produced during 1987 were 229,706 ounces of gold worth $104.5 million, 16.4 million short tons of gravel worth $42.7 million, and 1.51 million short tons of coal worth $42.3 million (table 2). Gold, sand and gravel, and coal account for 94 percent of the 1987 total production value of $202.4 million. Building stone, tin, silver, tungsten, jade, platinum, soapstone, and peat make up the remaining 6 percent. For the first time in 20 years, the value of metal production (primarily gold) exceeded the combined output of sand and gravel, building stone, jade, and soapstone.

The sand and gravel industry continued to decline, dropping 43 percent in value from 1986 due to greatly reduced construction and development activities on Alaska's North Slope and in the state's urban areas. Road construction at the Red Dog and Greens Creek mine projects kept the reduction in sand and gravel use from dropping to even lower levels.

Gold production in 1987 is estimated at 229,706 troy ounces, up 44 percent in volume and 71 percent in value from 1986. Ninety-seven percent of the gold---or 223,200 ounces---was produced by 199 mechanized placer mines. The increase in production is due to expanded operations at several large projects. The 10 largest gold mines produced 133,229 ounces---or 58 percent---of the state's total gold production. Hence, the significant increase in gold production does not reflect the precarious position of small, family-operated placer mines that are being increasingly squeezed by regulatory and legal problems. Between 1985 and 1986, the number of placer mines shrank from 266 to 192, a reduction of 27 percent. In 1987 there was a marginal increase from 1986 levels, when a total of 199 placer mines were operated.

The greatest impact on small miners in 1987, and possibly for the next few years, has been a lawsuit brought by the Sierra Club against the U.S. Bureau of Land Management (BLM). A federal judge granted an injunction that prohibits BLM from allowing mines that disturb more than 5 acres of land to operate on four major interior Alaska drainages until the agency completes cumulative environmental impact statements and other assessments on the lands in question. The injunction could halt some placer mining in key interior Alaska mining districts for 1 to 3 years. The management decisions resulting from the EIS's will undoubtedly affect the regulation of placer mining on other BLM lands throughout the state.

A second action that may further burden the small miner is the entry of the U.S. Army Corps of Engineers (Corps) into the regulatory process. Spurred by a request from the U.S. Fish and Wildlife Service, and under threat of legal action by the Sierra Club, the Corps will begin requiring applications from most Alaska mining operators for the 1988 season. Of importance will be the level of detail required by the Corps. The Corps is working to develop a streamlined permit process by which most placer mines will be subject to a general permit with standard stipulations and conditions.

Other problems facing miners are water-quality issues, a continuing court-ordered shutdown of mining in several national conservation units, and a legal challenge to the state's mining-claim location and

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Table 1. Total value of mineral industry in Alaska, 1985-87.

	1985	1986	1987
Exploration	$ 9,150,000	$ 8,914,744	$ 15,214,061
Development	34,120,775	24,331,972	100,250,848
Production	226,599,250	198,461,007	202,386,668
TOTAL	$ 269,870,025	$ 231,707,723	$ 317,851,577

Gain in total value, 1986-87, is $86,143,854.
Percentage gain is 37 percent.

Table 2. Reported mineral production in Alaska, 1985-87.[a]

Metals	Volume 1985	Volume 1986	Volume 1987	Value[b] 1985	Value[b] 1986	Value[b] 1987
Primary						
Gold (oz)	190,000	160,000	229,706	$ 61,175,000	$ 60,800,000	$104,516,230
Mercury (lb)	2,094	912	NR	10,000	2,800	NR
Antimony (lb)	65,000	45,000	NR	98,000	67,500	NR
Platinum (oz)	NR	W	W	NR	W	W
Silver (oz)	28,500	24,000	54,300	171,000	134,400	390,960
Tin (lb)	300,000	340,000	288,000	650,000	890,000	460,000
Tungsten (stu)	NR	120	160	NR	22,800	11,400
Subtotal				$ 62,104,000	$ 61,917,500	$105,378,590
Industrial minerals, coal, peat						
Jade & soapstone (ton)	W	2.0	3.6	W	$ 12,000	$ 78,000
Sand & gravel (mt)	28.2	20.9	16.4	112,062,750	75,761,507	42,659,808
Building stone (mt)	2.5	4.2	1.8	2,150,000	20,320,000	11,620,000
Subtotal				$124,212,750	$96,093,507	$ 54,357,808
Coal (ton)	1,370,000	1,492,707	1,508,927	$ 39,730,000	$ 40,410,000	$ 42,354,500
Peat (yd^3)	85,000	50,000	46,000	552,500	350,000	299,000
Subtotal				$ 40,282,500	$ 40,450,000	$ 42,653,500
TOTAL				$226,599,250	$198,461,007	$202,389,898

[a] Production data from DGGS questionnaires, U.S. Army Corps. of Engineers, and DOTPF personnel; precious-metal outlet data; interviews with mine operators; and other confidential sources.

[b] Average price of gold in 1987 assumed to be $455/oz; silver, $7.20/oz; peat, $6.50/$yd^3$, coal, $28.07/short ton (FOB Healy), and building stone, 6.45/ton. Sand and gravel averaged $2.61/ton statewide but varied widely by region. Other values provided by individual mine producers.

W = withheld
mt = million ton
stu = short-ton unit
NR = not reported

leasing systems. Governor Steve Cowper, who has been supportive of resolving state regulatory problems for small miners, declared in a March 30, 1987, memo to three state resource-management agencies that the continuation of the status quo was unacceptable. Governor Cowper assigned the resolution of water-quality conflicts as a priority of state agencies and further directed his Commissioners of Natural Resources, Environmental Conservation, and Fish and Game to take an active role in addressing federal and state regulatory and legal problems that impact the industry.

While the production and number of small placer mines have declined significantly from 1985, several larger operations have continued at high or expanded production levels. The western region---in particular, the Seward Peninsula---saw a large increase in gold mining activity (table 3). The Alaska Gold Company operated two upland dredges near Nome in 1987. In previous years, due to a lack of thawed placer reserves, the company operated only one of its two available dredges. However, a large-scale thawing project in 1986 set the stage for the renewed operation of the company's second dredge in 1987. The company employed 125 people at the height of the season's operations. Each dredge processed 5,500 to 6,000 cubic yards per day for a season total of about 1.4 million cubic yards, nearly doubling 1986 production. Inspiration Gold, Inc., operated its huge offshore bucketline dredge, the Bima, for over 4 months in 1987. Inspiration was Alaska's largest gold mine, producing 36,000 ounces of refined gold during the year. The Bima returned to Nome in June 1987 from the Port of Tacoma where it had undergone modifications to its gold-recovery system over the winter. The dredge, which operated from June 16 through November 23 and employed 86 people, was docked at Nome for the 1987-88 winter.

Two other large-scale placer projects operated in Nome in 1987. The Windfall Mining Company and Anvil Mining, Inc., used conventional sluice boxes and large-scale earthmoving equipment to process upland placer reserves. Both operations collectively employed 47 people during the season. The companies operate on land leased from the Alaska Gold Company that is unsuitable for mining by dredges.

The Valdez Creek Mining Company operating in southcentral Alaska continued to be one of the state's largest gold producers in 1987. During a 12-month production period, 33,277 ounces of refined gold were won from 362,000 cubic yards of pay gravel, up significantly from last year's production. Ninety percent of the 135 people employed by the company were Alaska residents. The company operated throughout the winter, and from their experience feel they can operate in temperatures of from 25° to 35° below zero before freezing problems shut them down.

Lost River Mining (Len Grothe - owner) continued placer tin mining at Cape Creek on the western Seward Peninsula and produced 288,000 pounds of equivalent refined tin for world markets. This small mine remains one of America's largest mine sources of tin.

Special mention should be made of several projects that were officially in preliminary production phases in 1987 but which had some potentially exciting results. Citigold Alaska, Inc., a subsidiary of La Teko Resources of Vancouver, B.C., completed its first year of a full-scale heap-leaching test. The project uses earthmoving equipment to stack surface-mineable reserves of oxidized quartz vein ore from the Ryan Lode property near Fairbanks. The vein material was agglomerated, stacked on two 50,000-ton pads, and leached using sodium cyanide. The company, which produced 6,100 ounces of gold-silver bullion in 1987, was Alaska's largest lode producer of precious metals. Production is expected to significantly increase in 1988. On a neighboring property, the Grant Mine conducted drilling programs to delineate surface mineable ore reserves to process in its mill. After extensive testing during the summer and fall, the company reopened the mine on December 1 and in 30 days recovered 907 ounces of refined gold from 5,662 tons of ore; 26 local Fairbanksans were employed during the production period. The Grant Mine operated briefly in 1985 producing from underground ore reserves, but production was halted when one of the project's joint-venture partners terminated their participation. At Hatcher Pass north of Anchorage, Alaska Hardrock Mining Company operated their 20 tpd mill from January through October and milled 1,050 tons of high-grade ore from the old Independence Mine. Increased production is planned for 1988.

Table 3. Reported refined gold production, number of operators, and industry employment in Alaska by region and mining district 1986-87.[a]

Region and mining district	1986 Operations	1986 Production (oz)	1986 Employment	1987 Operations	1987 Production (oz)	1987 Employment
Northern	4	4,500	15	6	5,256	40
Chandalar						
Shungnak						
Koyukuk-Nolan						
Western	42	53,000	363	46	101,244	414
Nome						
Kougarok						
Koyukuk-Hughes						
Port Clarence						
Fairhaven						
Ruby						
Solomon						
Koyuk						
Council						
Eastern Interior	83	45,350	375	81	50,696	380
Circle						
Livengood-Tolovana						
Fairbanks						
Fortymile						
Manley-Eureka						
Richardson						
Bonnifield						
Rampart						
Southcentral	30	39,000	268	29	46,460	251
Cache Creek						
Chistochina						
Valdez Creek						
Kenai Peninsula						
Nelchina						
Southwestern	33	18,000	128	36	20,650	129
Innoko-Tolstoi						
Iditarod-George River						
Moore Creek						
Nyac						
Crooked Creek						
Lake Clark-Mulchatna						
Southeastern and Alaska Peninsula	4	150	6	5	3,400	35
TOTAL	195	160,000	1,155	203	229,706	1,249

[a] This survey (1987) reports production from 199 mechanized placer and four lode operations statewide. Other small 'recreational and assessment' projects that recover gold bullion from small-scale pick-and-shovel panning, long-tom, and suction dredge activities are not included. We estimate that 80 recreational assessment operations employed 230 people in both 1986 and 1987.

Alaska production of coal in 1987, estimated to be 1.51 million tons, came exclusively from the Usibelli Mine: 707,200 tons were burned in interior Alaska power plants for electrical generation and steam heat; 644,708 short tons were shipped to the Korea Electric Power Company (KEPCO) for power generation in their Honam plant; and 133,069 tons were shipped to the Taiwan Power Company (Taipower) to be tested as a blending coal. The results of Taipower's blending tests have been favorable, and it is hoped that a modest export contract can be secured in the future. In mid-December Usibelli shipped 23,950 tons of steam coal to the Electric Power Development Corporation (EPDC) in Japan for a fluidized bed system test.

Exploration activities during 1987 jumped to $15.2 million, a 71 percent increase from the 1986 level of $8.9 million. This expansion in exploration may indicate that the mineral-exploration industry in Alaska is beginning to recover from the low levels of 1985 and 1986. Much of the exploration increase took place in the southeastern Panhandle. On Chichagof Island, the joint-venture partners who are exploring the Chichagof and Hirst Chichagof mines formed Golden Sitka Resources, Inc., a public company that was recently listed on the Vancouver Stock Exchange. Initial exploration discovered a new vein system and continuations of known veins in both mines with overall grades similar to the high unit values mined historically from these properties.

In the Juneau Goldbelt area, Echo Bay Mines continued its examination of the AJ Mine and acquired part ownership of the Kensington Mine. The AJ Mine produced from 1913 to 1944 and was renowned for its ability to profitably mine low grade ore. Work at the AJ in 1987 consisted of taking a 1,000 ton bulk sample from the Sheep Creek adit and shipping it to Lakefield, Ontario for evaluation. The known reserves at the AJ mine when it closed in 1944 were 29 million tons of ore grading 0.039 ounces per ton of gold. In mid-1987 Echo Bay, in partnership with Coeur d'Alene Mines, acquired the Kensington Mine near Berners Bay from Placid Oil for $20 million. Drill-indicated and geologically inferred reserves developed by Placid at the Kensington Mine are estimated to be 425,000 ounces of gold. Also in the Berners Bay area, Curator American, Inc., conducted an extensive drilling program at the Jualin Mine.

In southcentral Alaska, two drilling programs were performed on the Golden Zone property by Golden Zone Development, Inc. A gold bearing breccia pipe and vein systems on the property were the primary exploration targets. Favorable drilling results were reported.

In 1987 several new exploration partnerships and agreements were formed for the exploration of precious metals. In Nome, Aspen Exploration and Placer Dome U.S., Inc., formed a partnership to explore for upland lode sources of the Nome beach placers. Part of the effort included acquisition of land position from multiple landowners, including the Alaska Gold Company and Alaska native and village corporations. Initial work in 1986 located mineralized vein systems that crop out on the floor in a valley in the adjacent area. Core drilling in 1987 has indicated the vein system may be extensive.

In the interior region, the Doyon Native Corporation has signed separate exploration agreements covering a total of some 1 million acres of land with American Copper and Nickel and Electrum Resources. The Doyon Corporation owns 12 million acres of Alaska land, much which was selected for its mineral potential. Other native regional corporations reporting joint-venture exploration agreements with mineral firms include the Aleut Native Corporation, Cook Inlet Region, Inc., Sealaska, Calista Corporation, and Bering Straits Native Corporation.

In the Fairbanks area, the Fairbanks Exploration Company recently announced an exploration agreement with BP Minerals America. The companies are interested in exploring for and developing bulk mineable lode-gold deposits. Other companies with Alaska precious-metal exploration programs or partnership agreements include NERCO Minerals, GCO Minerals, Utah International, Alaska Apollo Gold Mines Ltd., Battle Mountain, Ashton Mining, Freeport McMoran, Cyprus Gold, Western Mining, Cominco, Lac Minerals, Newmont, Timberline Minerals, and the Misco-Walsh Company.

In the Matanuska coal field northeast of Anchorage, Union Pacific Minerals (formerly Rocky Mountain Energy), in partnership with the Idemitsu Kosan Company, completed a drilling and bulk-sampling program on state coal leases. Idemitsu Kosan asked the state to begin the administrative process to open additional lands on the south side of the Matanuska Valley for coal-prospecting permits and leasing. The area has not been previously recognized as having high potential for coal. Idemitsu Kosan, Japan's largest domestic oil company, recently completed a coal import terminal in Tokyo Bay and is using coal in several of its refineries. The company is primarily interested in high-volatile bituminous coals such as those found in the Matanuska Valley.

Mine-development expenditures increased 313 percent, from $24.3 million in 1986 to $100.3 million in 1987, the highest level ever recorded in Alaska. About 90 percent of this was expended for the development of the Red Dog zinc mine in northwest Alaska and the Greens Creek silver mine near Juneau.

In June 1987 the Greens Creek Mining Company, owned by Amselco Minerals (now BP Minerals America), Hecla Mining, CSX Oil and Gas Corporation, and Exalas Resources, decided to develop the Greens Creek mineral deposit. The property is located on Admiralty Island, 18 air miles from Juneau. Total development costs through 1988 are estimated at $82 million. According to current schedules the mine will be producing concentrates in December 1988. The Greens Creek Mine will be built to process 1,000 tons of ore per day and annually produce an estimated 84,000 tons of concentrate containing 6.4 million ounces of silver, 36,000 ounces of gold, 25,000 tons of zinc, and 9,000 tons of lead. At this production rate, Greens Creek Mine will become the largest silver producer in the United States. The mine concentrates have been presold to smelters in Japan, Australia, and Europe. The mine will employ about 230 workers who will commute by ferry from Juneau.

Construction is also underway on the Red Dog Mine in northwest Alaska. The mine is owned by the NANA Regional Corporation and operated by Cominco Alaska, Inc. The zinc-lead-silver deposit is unusual because it includes exceptionally high grades and large tonnages of ore that are amenable to open-cut mining. The mine's stripping ratio of 0.8:1 is extremely low when compared to almost any type of surface mining except for sand and gravel. The decision to proceed to development at Red Dog was made in late 1986. Full-scale development began in 1987 with the construction of a pioneer road from a port site on the Chukchi Sea to the minesite 52 miles inland. The pioneer road was completed in late November 1987, 1-1/2 months ahead of schedule. According to the construction schedule, production will begin in early 1990, and the first concentrate shipments will be shipped the following summer during the ice-free shipping season.

State and federal agencies continued mineral-resource investigations and published several reports. In 1986 and 1987, DGGS, under contract to U.S. Geological Survey (USGS), completed geologic mapping and geochemical studies and examined prospects and mines in the Steese-White Mountains National Recreational area. A final report that was released in November 1987 suggested that promising resources of tin, silver, rare-earth elements, and gold are found in the study area. In a separate study, the U.S. Bureau of Mines completed a placer resources evaluation of the Steese Recreation area.

The Alaska Minerals Commission, which was created by the State Legislature in 1986, presented their recommendations in an interim report to the Governor and Legislature in January 1988. The Commission is charged with making recommendations to mitigate the constraints on mineral development in Alaska. The Commission will expire after it presents its final report in January 1989.

During 1987, the Division of Mining worked closely with the U.S. Bureau of Land Management (BLM) and the Alaska Division of Land and Water Management to prioritize mineral-rich, state-selected lands for transfer to the state. Since 1986, the state has received title to 420,000 acres of these lands in central and western Alaska. The Division of Mining has also worked with miners and the U.S. Environmental Protection Agency to help 150 mine operators obtain modifications related to turbidity requirements on their 1987-88 effluent discharge permits. A surface-mining permit was approved for the

Diamond Alaska coal project at Beluga. In the nearby Matanuska Valley a lease tract was offered; the successful bidder, Union Pacific Minerals, will add this to existing coal leases being explored for potential sources of coal for export to Japan.

In cooperation with DGGS, private companies, and individuals, the USGS released U.S. Geological Survey Bulletin 1786, 'Significant metalliferous lode deposits and placer districts of Alaska,' a concise and up-to-date summary of Alaska's mineral resources.