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SUMMARY OF ALASKA'S MINERAL INDUSTRY, IN 1989

by

T.K. Bundtzen and R.C. Swainbank

Alaska Division of
Geological and Geophysical Surveys

in cooperation with

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and
Division of Mining

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Fairbanks, Alaska 99709

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INTRODUCTION

Alaska's mineral industry experienced positive growth during 1989, especially in the hard-rock mining and exploration sectors but suffered declines in mineral-development expenditures and in sand-and-gravel and stone production. Exploration expenditures totaled $45.9 million in 1989 compared to $45.5 million in 1988. Overall value of mineral production, which increased 27 percent from $232 million in 1988 to $294.9 million in 1989 (table 1), is attributed mainly to production of metal concentrates from the Greens Creek mine near Juneau. Mineral-development expenditures decreased substantially in 1989 to $131.6 million from an all-time high of $274.5 million in 1988. The decrease reflects the shift from development to production modes within the large Green Creek and Red Dog projects. Total value of Alaska's mineral industry in 1989, as measured by the sum of exploration and development expenditures and mineral production, amounted to $472.5 million in 1989, compared with $552.6 million in 1988, a decrease of about 14 percent due to the drop in development activities (table 2). During 1989 an estimated 4,170 people were employed in mineral-related sectors of the economy.

PRODUCTION

Gold was the most valuable mineral commodity in 1989, accounting for 39 percent of Alaska's total mineral production revenues. Zinc and silver each make up about 11.5 percent of the total; lead, 3.1 percent; and tin, another 0.2 percent. Platinum, tungsten, and mercury have all been produced in Alaska in past years, but, recently, production figures for these metals have been withheld. Overall metallic mineral production accounted for 65 percent of total mineral values, reversing a 25-yr period dominated by the nonmetallic materials coal, sand and gravel, stone, peat, and jade, which account for the remaining 35 percent of the values.

The amount of gold produced in 1989--an estimated 297,900 oz (9,234 kg) worth $113.8 million--was the highest since 1942 and represents an increase of 12 percent by volume from 1988 levels (tables 1 and 3). Despite the increase in production, total gold values were about the same as in 1988 due to lower bullion prices (table 1). Gold production was reported from 222 operations, a net gain of 11 from 1988 (table 3). About 83 percent of the gold (247,948 oz; 7,672 kg) was recovered from 217 placer mines; the remaining 17 percent (50,402 oz; 1,562 kg) was recovered from 5 lode mines.

Greens Creek Mining Company, the largest lode-silver mine in the United States during 1989 and the second largest lode-gold mine in Alaska, produced 11,622 short tons (10,541 metric tons) of lead, 23,066 short tons (20,921 metric tons) of zinc, 6,411,469 oz (198,756 kg) of silver, and 38,813 oz (1,141 kg) of gold from 264,600 tons of ore (table 1). The remaining lode gold was produced by several mines in interior and southcentral Alaska, including Ryan lode of Citigold Alaska Inc., Democrat mine of Tri-Valley Mining Co., and the Grant mine-and-mill complex of Tri-con Mining Inc., all located in the Fairbanks area, and Alaska Hardrock Mining Co. at Hatcher Pass.

Valdez Creek Mining Company, situated near Cantwell, was again Alaska's largest placer-gold mine, producing 71,942 raw oz (2,230 kg) of gold. In spite of profitable operations, the mine was closed in late October. Due to the closure, overall Alaska gold production is expected to decrease, unless the mine resumes production in 1990.

Alaska Gold Company continued gold-placer operations at Nome with two large onshore dredges. WestGold's dredge 'Bima,' mining offshore of Nome, recovered about 29,000 oz (899 kg) of gold despite mechanical difficulties earlier in the season.

A total of about 194,000 lb (88,021 kg) of placer tin was produced from the Seward Peninsula by Lost River Mining Company, Alaska's largest tin producer, and from the Manley Hot Springs area by Shorham Resources (table 1). The Lost River Mining Company, however, exhausted its reserves and therefore dismantled its operation late in the season.

[1]Alaska Division of Geological and Geophysical Surveys, 3700 Airport Way, Fairbanks, Alaska 99709.
[2]Alaska Division of Business Development, 1001 Noble Street, Ste. 360, Fairbanks, Alaska 99701.

Table 1. *Reported mineral production in Alaska 1987-89*[a]

	Quantity			Estimated values[b]		
Metals	1987	1988	1989	1987	1988	1989
Gold (ounces)	229,700	265,500	297,900	$104,516,230	$112,837,000	$113,795,890
(kilograms)	7,121	8,231	9,234			
Silver (ounces)	54,300	47,790	6,456,469	390,960	281,950	33,896,462
(kilograms)	1,683	1,481	200,150			
Platinum (ounces)	W	25	W	W	13,750	W
(grams)	W	775	W			
Lead (short tons)	NR	NR	11,622	NR	NR	9,297,800
(metric tons)	NR	NR	10,541			
Zinc (short tons)	NR	NR	23,066	NR	NR	34,137,500
(metric tons)	NR	NR	20,921			
Mercury (pound)	NR	W	W	NR	W	W
(kilograms)	NR	W	W			
Tin (pound)	288,000	300,000	194,000	460,000	950,000	672,000
(kilograms)	130,671	136,116	88,021			
Tungsten (short ton unit)	160	240	NR	11,400	14,000	NR
(kilograms)	1,451	2,177	NR			
Subtotal				$105,378,590	$114,096,700	$191,799,652
Industrial minerals, coal and peat						
Jade and soapstone (short tons)	3.6	W	57.0	$ 78,000	$ W	$ 1,140,000
(metric tons)	3.3	W	51.7			
Sand and gravel (million short tons)	16.7	17.2	14.5	42,659,808	48,750,508	39,875,000
(million metric tons)	15.1	15.6	13.2			
Building stone (million short tons)	1.8	3.6	2.9	11,620,000	24,650,000	20,340,000
(million metric tons)	1.6	3.3	2.6			
Subtotal				$ 54,357,808	$ 73,400,508	$ 61,355,000
Coal (short tons)	1,508,927	1,551,162	1,452,353	$ 42,354,500	$ 44,300,000	$ 41,464,800
(metric tons)	1,368,596	1,406,903	1,317,284			
Peat (cubic yards)	46,000	55,000	51,000	299,000	375,000	352,000
(cubic meters)	32,840	39,270	36,400			
Subtotal				$ 42,653,500	$ 44,675,000	$ 41,816,800
TOTAL				$202,389,898	$232,172,208	$294,971,452

[a]Production data from DGGS questionnaires, phone interviews with mine operators, Alaska Department of Transportation and Public Facilities, the U.S. Army Corps of Engineers, and other confidential sources.

[b]Values calculated from 1989 annual price averages of gold, silver, platinum, zinc, and lead reported in the 'Mining Journal'; other values supplied directly by mine operators. Coal-value estimates include some in-state freight costs.

NR = not reported; W = withheld.

Cominco Alaska Inc. began producing zinc concentrates late in the year from the Red Dog mine, which is owned by the NANA Regional Corporation of northwest Alaska. Red Dog is expected to produce 400,000 metric tons of zinc concentrates for shipment in September and October 1990, making it the western world's largest zinc producer.

The sand-and-gravel and stone industries suffered significant setbacks during the year due to virtually no oil-and-gas infrastructure development on Alaska's North Slope and a continuing lull in urban-area construction projects. An estimated 14.5 million short tons (13.2 million metric tons) of sand and gravel worth $39.9 million were produced in 1989, a decrease of 18 percent by volume and value from 1988 levels.

Table 2. *Total value of mineral industry in Alaska, 1987-89*

	1987	1988	1989
Exploration	$ 15,740,000	$ 45,468,800	$ 45,903,596
Development	100,250,848	274,945,400	131,579,550
Production	202,389,898	232,172,000	294,971,452
TOTAL	$318,380,746	$552,586,200	$472,454,598

An estimated 2.9 million short tons (2.6 million metric tons) of stone worth $20.3 million were quarried in 1989, a decrease by volume and value of 17 percent from 1988 levels (table 1). Given the reduced level of development on the North Slope and a weakened construction industry, these low levels are expected to continue to decline in 1990.

Usibelli Coal Mines Inc. sold 705,258 short tons (638,258 metric tons) of coal to the Korean Electric Power Company (KEPCO) in Honam, Korea, and fueled six interior power plants with 747,095 short tons (676,868 metric tons) of coal for total coal production of 1,452,353 short tons (1,317,284 metric tons), a 6-percent decrease from the previous year (table 1). The KEPCO contract allows for coal shipments to range from 680,000 to 920,000 short tons; 1989 shipments reflect the lower end of the range.

DEVELOPMENT

Mineral-development expenditures totaled $131.6 million in 1989, a 52-percent drop from $274.5 million spent in 1988. The lower 1989 development expenditures reflect completion of the development phase of both the Greens Creek and Red Dog mine projects, which accounted for more than 95 percent of the 1988 development total. At Red Dog, Cominco Alaska contracted several companies to assembly the mine-and-mill site, construct a conveyer at the port site, and strip the ore body in preparation for mining. WestGold contracted Peratrovich Nottingham and Drage Inc. to design and construct an open-cell, steel-sheet-pile dock off the Nome causeway to stage offshore-dredging activities. Thirty placer-mining companies and three sand-and-gravel firms reported $10.5 million in development expenditures, all of which were used in preparation for mine production in 1990. Idemitsu Alaska spent $2 million in anticipation of exporting bituminous coal from the Wishbone Hill mining district near Palmer to Japanese markets.

EXPLORATION

Alaska mineral-exploration expenditures reached the high levels established in 1988, totaling $45.9 million (table 4). In contrast, mineral exploration generally declined in northwestern Canada and in many western states this past year. Returns from 61 mining firms and small partnerships working in Alaska indicate that precious-metal exploration accounted for 91.6 percent of total mineral-exploration expenditures, base-metal exploration accounted for 6 percent, and coal- and industrial-minerals exploration accounted for 2 percent and 0.4 percent, respectively. Individuals employed year-round in mineral exploration jobs in Alaska totaled 245.

Three advanced exploration projects--the Fort Knox project (Fairbanks Gold Inc.) near Fairbanks and the Kensington and Alaska Juneau projects (Echo Bay Mines) near Juneau--accounted for 59 percent of statewide exploration expenditures. The two big southeastern projects focused on reevaluation of past gold-producing mines, whereas the Fort Knox project explored a new discovery.

All other regions of the state experienced healthy levels of exploration activities. Notable projects that had exploration-drilling programs include NANA Corporation, Paradise Valley Mining, and Cominco Alaska in the northern region; Caithness Alaska, Livengood Placers, Placer Dome Inc., and WestGold in the western region; Placer Dome, Nerco Minerals, Fairbanks Exploration, Usibelli Coal Mines, Inc., and American Copper and Nickel in the eastern interior region; Cominco, Valdez Creek Mining Company, Amax, Placer Dome, and Hobbs Industries in the southcentral region; WestGold, Calista Corporation, and R.A. Hanson and Company in the southwestern region; and Placer Dome, Lac Minerals, Pulsar and Newmont Mining in the southeastern region.

Table 3. *Reported refined gold production, number of operators, and industry employment in Alaska by region and mining district, 1988-89*[a]

Region and mining district	1988 Number of operators	1988 Production (oz)	1988 Number of employees	1989 Number of operators	1989 Production (oz)	1989 Number of employees
Northern	8	6,500	32	13	6,800	38
Chandalar						
Shungnak						
Koyukuk-Nolan						
Western	48	98,500	425	43	87,500	437
Nome						
Koyukuk-Hughes						
Kougarok						
Port Clarence						
Fairhaven						
Ruby-Poorman						
Solomon						
Koyuk						
Council						
Eastern Interior	89	76,550	415	115	79,300	494
Circle						
Livengood-Tolovana						
Fairbanks						
Fortymile						
Manley-Eureka						
Richardson						
Bonnifield						
Rampart						
Southcentral	30	68,300	315	21	73,100	280
Cache Creek						
Chistochina						
Valdez Creek						
Kenai Peninsula						
Nelchina						
Southwestern	33	14,800	108	26	13,950	102
Innoko-Tolstoi						
Iditarod						
Moore Creek						
Nyac						
Crooked Creek						
Lake Clark-Mulchatna						
Southeastern and Alaska Peninsula	3	850	10	4	37,245	126[b]
TOTAL	211	265,500	1,305	222	297,895	1,477

[a]1989 production estimated from 217 mechanized placer mines and 5 lode mines statewide. Small 'recreational-assessment' projects that recover bullion by panning, pick-and-shovel prospecting, long-tom sluicing, and suction dredging are not included.

[b]Employment from Greens Creek mine totaled 243, but because half the production value from the mine comprises gold and silver, only half the employment figure is credited to the table.

Table 4. *Reported exploration expenditures in Alaska by commodity and region, 1989*

	Northern	Western	Eastern interior	South-western	South-central	Alaska Peninsula	South-eastern
Base metals	$550,000	$ 40,000	$1,374,000	$ 103,000	$ 100,000	$ --	$ 886,000
Precious metals							
Placer	23,000	2,092,500	217,000	765,000[a]	131,600	--	--
Lode	350,000	1,435,000	7,130,500	2,775,000	1,489,700	1,690,000	23,756,000
Coal and peat	--	--	144,000	--	720,296	--	--
Industrial minerals	--	--	--	40,000	--	20,000	65,000
Other	--	--	5,000	--	--	--	--
TOTAL	$923,000	$3,567,500	$8,870,500	$3,683,000	$2,441,596	$1,710,000	$24,707,000
Employment							
(person-days)	1,300	8,437	15,438	5,455	6,077	2,810	41,255
(person-months)	43	281	514	182	169	94	1,309
Number of companies reporting	6	11	23	11	19	5	8

[a]Dominantly for platinum metals.

-- = No expenditures reported.

GOVERNMENT ACTIONS

Several significant legal or government actions affecting the future of Alaska's mineral industry took place in 1989. In May, the Alaska legislature amended certain state laws governing the location of state mining claims and implemented rental and royalty fees for all mining on state lands. This legislation was in response to the Alaska Supreme Court's decision that section 6(i) of the Alaska Statehood Act did require the state to collect rents and royalties from mining activity on state lands. The statute became effective August 31, 1989, and requires rent on mining claims, leasehold locations, and upland and offshore mining leases on all state land. Annual rent is due on September 1 and must be paid no later than November 30 of each year. Rents begin at $20 for each mining claim and $0.50 per acre for each mining lease and will escalate through time. The Alaska Division of Mining is currently drafting the regulation that will require the additional 3-percent net royalty payment from operating mines. Miners are currently required to pay an Alaska mining tax on net income from mining activities on all Alaska lands, regardless of ownership.

In response to the successful operation of the Bima dredge in State of Alaska waters, the U.S. Minerals Management Service issued a draft environmental impact statement (EIS) for a proposal to offer to lease about 155,000 acres of federal offshore lands on the continental shelf. The EIS identified the potential for mercury bioaccumulation in the food chain within the Nome area. Mercury had previously been used to amalgamate gold bullion during placer-mining operations in the area, and sporadic test results had showed some high levels of the element. Because of fears generated from the potential problem, the U.S. Minerals Management Service delayed the lease sale and contracted Battelle Northwest to conduct extensive metal analyses of water discharge from the Bima dredge and from human-hair samples collected from Nome residents. Results showed that neither the levels of mercury in the discharge nor that in the hair samples exceeded established EPA standards. In fact, the first-year results show that levels of methylmercury in Nome residents are among the lowest of any indigenous coastal people in North America. The federal lease proposal is now expected to be completed in mid-1991, about 18 mo behind the original 1989 schedule.

In related action, the Alaska Division of Mining issued two pre-lease evaluations, a 'Best Interest Finding' and a 'Coastal Consistency Determination,' regarding issuance of offshore prospecting permits within the state's 3-mile limit near Nome. Later in the year additional state offshore leases were issued.

The number of small placer-gold mines increased by 10 in 1989, mainly as a result of the resolution of a 1987 federal court injunction that had previously prevented or greatly limited mining activities on federal lands in the Fortymile and Chatanika Rivers, Beaver Creek, and Birch Creek drainages within the Circle mining district of interior Alaska. Recently

implemented water recycling and reclamation laws, however, necessitated extensive mine-plan revisions, which resulted in lower average bullion output by small placer-mining companies statewide.

EDUCATION AND RESEARCH

Several foreign exchanges program involving Alaska and Soviet geologists took place during 1989. During a 5-1/2 week period in August and September 1989, an Alaska team of economic geologists visited mineral districts in the Magadan, Kamchatka, Kharbarovsk, and Primorye' regions of the Far East of the USSR. These field investigations were conducted as part of a 2-yr reciprocal agreement signed by the Far East Branch of the Soviet Academy of Sciences and the U.S. Geological Survey to study the ore deposits of Alaska and the Soviet Far East. DGGS is officially participating in the project, which will result in publication of metallogenic maps of Alaska and the Magadan region at 1:2,500,000 scale, as well as other technical papers.

The Alaska Science and Technology Foundation funded an exchange between the University of Alaska Mineral Industry Research Laboratory and the All-Union Research and Scientific Institute of Gold and Rare Metals in Magadan to compare and contrast placer-mining methods in the Magadan region with those in Alaska. In September 1989, three Alaska mining engineers visited placer developments in the Magadan region; in 1990 a similar contigent of Russian personnel will visit Alaska placer mines.

Usibelli Coal Mines Inc. obtained a Federal Clean Coal Technology grant that may facilitate construction of a state-of-the-art mine-mouth power plant and drying facility at Healy, Alaska. The $93.2 million grant was one of 13 awarded nationwide by the Federal Department of Energy under the Clean Coal Technology Program.