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**SUMMARY OF ALASKA'S MINERAL INDUSTRY FOR 1990**

by

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Alaska Division of  
Geological and Geophysical Surveys

in cooperation with

Division of Business Development  
and  
Division of Mining

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## INTRODUCTION

Preliminary estimates of the value of mineral production show increases to about \$534 million in 1990. This nearly doubles the \$277 million value reported in 1989 (figure 1). Development expenditures fell to \$11.4 million in 1990, down 93 percent from the \$134.3 million in 1989. This dramatic drop occurred because the Red Dog and Greens Creek Mines completed their development phases in 1990. Exploration expenditures, rose 19 percent in 1990 to \$56.7 million from \$47.8 million in 1989. Total value of the mineral industry was almost \$602 million, an increase of 31 percent from 1989 levels (table 1). An estimated 3,870 workers were employed in all aspects of mining (table 2).

The Alaska legislature ratified new legislation relating to the implementation of rental and net royalty fees from claims on all state lands and progressive legislation requiring reclamation on all state, federal, and private mining lands. However, mineral leasing in the Usibelli and Wishbone Hill coal districts has been suspended as a result of the mental health lands lawsuit. The mental health lands dispute stopped an important coal export project at Wishbone Hill. The executive and legislative branches of government are seeking to resolve this issue.

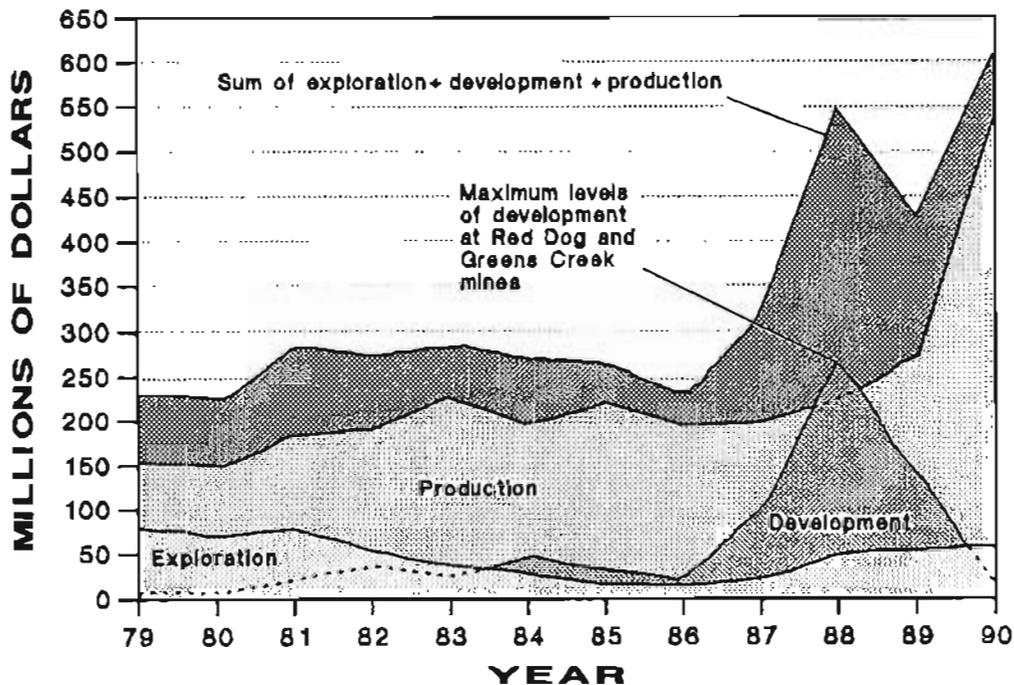


Figure 1. Value of total mineral activity in Alaska, 1979-90

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Table 1. *Total value of mineral industry in Alaska, 1988-90*

	1988	1989	1990
Exploration	\$ 45,468,800	\$ 47,762,596	\$ 56,735,000
Development	274,945,400	134,272,350	11,366,000
Production	<u>232,172,000</u>	<u>276,983,741</u>	<u>534,003,000</u>
<b>TOTAL</b>	<b>\$552,586,200</b>	<b>\$459,018,687</b>	<b>\$602,104,000</b>

### PRODUCTION

The Red Dog Mine of Cominco Alaska was operating at near design capacity by year end. The company shipped 320,000 tons of concentrates during the year, or about half of the projected full scale annual production.

Greens Creek Mining Company on Admiralty Island mined about 385,000 tons of sulfide ore, and produced about 7.6 million ounces of silver, 38,000 ounces of gold, 37,000 tons of zinc, and 16,500 tons of lead (in concentrates). For the second consecutive year Greens Creek Mine is believed to be America's largest silver mine.

The approximate value of zinc produced in Alaska in 1990 was \$253.7 million, of lead \$30.9 million, and of silver \$50.7 million

Greens Creek Mining Company was also Alaska's largest gold producer followed by Alaska Gold Company placer operations and Westgold Inc, both near Nome. Cambior Mines, new operators of rich placer deposits at Valdez Creek near Cantwell, diverted the creek in preparation for full-scale production in 1991. Late in the year Westgold announced its decision to close down the BIMA offshore dredging operation near Nome, resulting in the loss of about 125 jobs. Gold production at Citigold's Ryan Lode property near Fairbanks was also greatly reduced (to 2,200 ounces of gold) and the company concentrated on exploration drilling.

Table 2. *Alaskan mine employment estimates 1990*

Gold/silver mining	
Placer	1,151
Lode	265
Base metals	425
'Recreational'	315
Sand and gravel	645
Building stone	160
Coal	115
Peat	--
Tin, jade, soapstone, ceramics, platinum	40
Mineral development	450
Mineral exploration	300
<b>TOTAL</b>	<u><b>3,866</b></u>

-- = Information not available.

About 216 gold placer mines throughout the state produced 192,800 troy ounces of gold with a nominal value of \$74.2 million at an average 1990 value of \$385 per troy ounce. Total production of lode and placer gold was estimated at 231,700 ounces, worth \$89 million (table 3).

About 57,000 pounds of placer tin were produced from near Manley and Ruby in the central interior of Alaska, but there was no significant production from the Seward Peninsula in 1990.

Stone, sand and gravel production recovered somewhat from low production levels of 1989 because of large transportation-related projects in the Anchorage and Fairbanks areas. However the industrial mineral industry remained relatively weak; preliminary figures suggest sales of about \$63.9 million, up from about \$60.0 million in 1989.

Usibelli Coal Mine, Inc. in the central interior of the state produced an all-time high record of 1,567,000 short tons of coal with a value of about \$44 million. About half of the coal was used for energy production in central Alaska, and the rest was shipped to the Korean Electric Power Company in South Korea for power generation.

## DEVELOPMENT

Although several major projects are in advanced stages of exploration, there have been no production decisions. As a result, development expenditures dropped 90 percent from 1989's \$134.0 million to only \$11.4 million in 1990.

Valdez Creek is being rerouted in preparation for continued pit development up-valley. This and thaw-field drilling by the Alaska Gold Co. at its Nome dredges account for a substantial part of the development expenditures. Feasibility studies for the Idemitsu Alaska-Wishbone Hill and Diamond Alaska coal projects accounted for about 25 percent of statewide development activities.

## EXPLORATION

Exploration expenditures rose 19 percent from \$47.8 million in 1989 to \$56.7 million in 1990. Almost half of the exploration, \$24.9 million, was on the three gold properties in advanced exploration near Juneau—the Kensington (by Echo Bay/Coeur d'Alene Mines), the A-J/Treadwell (by Echo Bay), and the Jualin (by Placer Dome/Granges). A further \$11.0 million was invested in the Fairbanks area, predominantly in drilling on Ester Dome by Citigold and American Copper and Nickel Co., and on the Fort Knox property by Fairbanks Gold, Inc. (table 4). There was also significant exploration activity on the Seward Peninsula at Rock Creek, Anvil Creek, and Mt. Distin by a complex joint venture which included Tenneco Minerals, Aspen Exploration and both the Sitnasuak and Bering Straits Native Corporations.

Moneta Porcupine Mines drilled three holes in the Lik deposit in 1990 and agreed to buy GCO Minerals' 50 percent stake in the project. The other 50 percent is owned by Echo Bay Mines. Stated reserves at Lik, which is only 12 miles from the Red Dog Mine, are 18 million tons grading 10 percent zinc, 3 percent lead, and 1.5 ounces per ton silver.

Table 3. Reported mineral production in Alaska 1988-90<sup>a</sup>

Metals	Quantity			Estimated values <sup>b</sup>		
	1988	1989	1990	1988	1989	1990
Gold (ounces)	265,500	284,617	231,700	\$112,837,000	\$108,723,694	\$89,204,000
(kilograms)	8,258	8,852	7,206			
Silver (ounces)	47,790	5,211,591	10,135,000	281,950	27,360,852	50,675,000
(kilograms)	1,486	162,102	315,199			
Platinum (ounces)	25	W	NR	13,750	W	NR
(grams)	777	W	NR			
Lead (tons)	NR	9,585	44,220	NR	7,672,009	30,954,000
(tonnes)	NR	8,698	40,106			
Zinc (tons)	NR	19,843	181,200	NR	29,383,400	253,680,000
(tonnes)	NR	18,007	164,350			
Mercury (pounds)	W	W	NR	W	W	NR
(kilograms)	W	W	NR			
Tin (pounds)	300,000	194,000	57,000	950,000	672,000	200,000
(kilograms)	136,080	87,988	25,855			
Tungsten (short ton units)	240	NR	NR	14,000	NR	NR
(kilograms)	217	NR	NR			
Subtotal				\$114,096,700	\$173,811,941	\$424,713,000
<b>Industrial minerals, coal and peat</b>						
Jade and soapstone (tons)	W	57.0	W	\$ W	\$ 1,140,000	\$ W
(tonnes)	W	51.7	W			
Sand and gravel (million tons)	17.2	14.4	15.1	48,750,508	39,875,000	41,800,000
(million tonnes)	15.6	13.1	13.7			
Building stone (million tons)	3.6	2.9	3.2	24,650,000	20,340,000	22,100,000
(million tonnes)	3.3	2.6	2.5			
Subtotal				\$ 73,400,508	\$ 61,355,000	\$ 63,900,000
Coal (tons)	1,551,162	1,452,353	1,576,000	\$ 44,300,000	\$ 41,464,800	\$ 44,990,000
(tonnes)	1,407,214	1,317,574	1,429,400			
Peat (cubic yards)	55,000	51,000	65,000	375,000	352,000	400,000
(cubic meters)	42,053	38,995	49,699			
Subtotal				\$ 44,675,000	\$ 41,816,800	\$ 45,390,000
<b>TOTAL</b>				<b>\$232,172,208</b>	<b>\$276,983,741</b>	<b>\$534,003,000</b>

<sup>a</sup>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.

<sup>b</sup>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.

Table 4. Reported exploration expenditures in Alaska by commodity and region, 1990

	<u>Northern</u>	<u>Western</u>	<u>Eastern interior</u>	<u>South-western</u>	<u>South-central</u>	<u>Alaska Peninsula</u>	<u>South-eastern</u>
Base metals	\$ 50,000	\$ 180,000	\$ 1,106,200	\$210,000	\$ 765,000	\$1,125,000	\$ 570,000
Precious metals							
Placer	57,000	2,190,760	47,143	110,000	418,150	--	41,484
Lode	250,000	5,385,000	14,110,000	600,500	358,900	2,575,000	25,975,000
Coal and peat	--	--	181,000	--	--	--	--
Industrial minerals	--	--	20,000	2,000	25,000	70,000	215,000
Other <sup>a</sup>	25,000	--	30,000	2,000	40,000	--	--
<b>TOTAL</b>	<b>\$382,000</b>	<b>\$7,755,760</b>	<b>\$15,494,343</b>	<b>\$924,500</b>	<b>\$1,607,050</b>	<b>\$3,770,000</b>	<b>\$26,801,484</b>
Employment							
(person-days)	4,250	11,312	22,643	2,992	5,068	6,750	42,160
(person-months)	142	377	755	100	169	225	1,405
Number of companies reporting	4	12	26	10	17	5	13

<sup>a</sup>Jade, platinum, diamonds, and colored gemstones.  
 -- = No expenditures reported.

Initial plans consider milling 1.2 million tons per year, but an additional 10,000 to 15,000 feet of drilling will probably be necessary to refine the reserve picture.

In the McGrath area, Central Alaska Exploration, Inc. continued intensive work on its Nixon Fork properties and anticipate a development decision regarding a small hard rock mining operation on the high-grade gold skarn in the near future. Fairbanks Gold, Inc., continued exploration at Chicken Mountain near Flat.

At Illinois Creek, Vinta Explorations completed 6,030 feet of reverse-circulation drill holes to infill the 54,000 feet of drilling done previously by Anaconda Minerals. Previous geologic reserves were 1.7 million tons with grades of 0.071 ounces per ton gold and 2.05 ounces per ton silver, to a depth of 250 feet distributed along 1,000 feet of strike. Total strike length of the system is greater than 3,000 feet.

The Sleitat deposit, discovered by Cominco Alaska, Inc. in 1983, consists of high grade cassiterite-quartz topaz greisen zones in a 59 million-year-old tin granite complex about 70 miles northwest of Iliamna. One drill hole intersected 95 feet of 1.56 percent tin and about 1 ounce per ton silver. Cominco Alaska announced the discovery of a major copper-gold porphyry, also near Iliamna. Preliminary drilling results indicate reserves of 200 million tons of 0.4 percent copper and 0.012 ounces per ton gold. Both deposits were found on state-owned lands.

Canalaska Resources Ltd. continued to evaluate gold in granodioritic intrusives at Rainbow Hill, upstream of Cambior's Valdez Creek placer deposit. Twelve thousand feet of drilling delineated approximately 1,000 feet of strike in the TMC zone with inferred

reserves of 262,000 tons grading 0.151 ounces per ton gold over an average 10 foot width. Detailed geophysics suggest the zone has a strike length in excess of 4,000 feet.

Placer Dome U.S. began surface evaluation near Cantwell of the Golden Zone Resources Inc. mine. Reserves at the mine include 1.7 million tons grading 0.134 ounces per ton gold.

Although placer and coal drilling decreased from 1989, hard rock core drilling increased, from 240,000 feet in 1989 to 550,000 feet in 1990. The increase reflected intensified work at advanced exploration projects.

### **GOVERNMENT ACTIONS**

In late January 1990, the Alaska Department of Natural Resources ceased approval of land sales, land exchanges, and mineral leases on approximately 1-million acres of Mental Health Lands throughout the 49th state. The order was issued because the state and Alaska Mental Health Trust could not agree on resolution and recompensation by the state on trust-designated lands. These lands were set aside at statehood in 1958 in order to generate revenues for mental health needs in Alaska. In 1985, the Alaska Supreme Court ordered the state to reimburse the Mental Health Trust for lost compensation. These important lands include those with significant mineral potential in the Fairbanks area and in the Healy and Matanuska coal fields. Scheduled issuance of a coal lease to Idemitsu-Alaska was cancelled, which stopped development of the Wishbone Hill coal export project near Anchorage. Resolution of the lands dispute has been given high priority in the Alaska Legislature.

The Alaska Legislature ratified legislation requiring the implementation of reclamation of mines on all state, federal, and private lands. Included in the legislation is a bonding pool administered by the state and stipulations that ask for restoration to primary-use categories of lands. The Alaska Division of Mining released a draft of the proposed regulations at years end.

The Alaska Division of Mining began collecting rental payments from state mining claims in response to the passage of Alaska State Legislature Senate Bill 129 in 1989. Payment was made for mineral land use activities in both 1989 and 1990.

### **ADVANCED EXPLORATION PROJECTS**

#### **Fort Knox**

The Fort Knox gold property, located about 15 miles northeast of Fairbanks, is 51 percent owned by Fairbanks Gold, Ltd., with the remainder held by Ventures Trident II Limited Partnership of Lakewood, Colorado, and Bob Nye. Gold occurs in several generations of quartz veins and veinlets within a broad northwesterly-trending zone, crosscutting a Cretaceous granodiorite/quartz monzonite stock. Associated trace minerals include molybdenite, bismuthinite, scheelite, pyrite. Preliminary tests by Lakefield Metallurgical Labs., in Ontario, Canada, indicate 95 to 97 percent recovery using 0.46 to 0.68 pounds cyanide per ton. Strathcona Mineral Services supervised excavation of a

45,000-ton bulk sample from a 170,000-ton pit in 1990 and are conducting bulk sample assays for cyanide leaching of the material. Davy McKee Corporation has been selected as contractor for the pre-feasibility study.

Earlier company press releases indicated that the deposit contains between 4.74 and 6.04 million ounces of gold contained in 99- to 195-million tons of rock, depending on the cut-off grade. This was based on 160,000 feet of reverse-circulation drilling and 30,000 feet of diamond drilling. In situ gold grades are reported to be between 0.031 ounces per ton and 0.048 ounces per ton, at cutoff grades of 0.01 to 0.02 ounces per ton. The Fairbanks Mining District, covering about 800 square miles, produced about 8-million ounces of gold, of which only about 300,000 ounces were from hard rock mines. Fairbanks Gold is currently seeking a buyer for the property.

### **Kensington**

Jointly owned by Coeur Alaska and Echo Bay Mines, the Kensington project is located on the east shore of Lynn Canal, about 50 miles north of Juneau. Recent company press releases place reserves at 12.8 million tons with a grade of 0.148 ounces per ton containing 1.9 million ounces of gold, mainly as the gold telluride calaverite with minor native gold. Preliminary plans would suggest recovery at a mining rate of 4,000 tons per day, or 200,000 ounces of gold per year.

Gold occurs in the Jualin diorite of Jurassic or Cretaceous period in a complex vein stockwork with an average north-south trend and 65-degree east dip. The system, which is open to the south and at depth is at least 1,500 feet long and 2,500 feet deep, and has an average width of about 60 feet. Individual veins are from one inch to several feet wide, and are often enclosed in zones of potassic alteration enclosed within broader zones of widespread propylitic alteration.

A 5,200-foot adit at the 800-foot level provides access to the Kensington vein stockworks. The rock in the proposed mine area is extremely competent and has required only 1,000 rock bolts in over 11,000 feet of tunnel. This characteristic will allow relatively inexpensive longhole open stoping methods using both transverse and longitudinal stopes.

### **Jualin**

Placer Dome U.S. is currently earning a 50 percent share in this property from International Curator Resources, (60 percent) and Granges, Inc., (40 percent). Granges, Inc. optioned it with a 5 percent royalty from Hyak Mining Co., a Juneau-based company. In mid 1990, 100 drill holes totalling 73,000 feet had been drilled in the Main Zone to indicate a resource of 1.04-million tons at 0.28 ounces per ton. By November 1990, a total of 1.07-million tons at an uncut grade of 0.349 ounces per ton was reported, without consideration of mining or metallurgical constraints.

Like the Kensington deposit only a few miles to the northwest, the Jualin is hosted in the multiphase Jualin diorite, which has compositions ranging from diorite to quartz monzonite. About 20 percent of the pluton is sheared, and the brittle fractures in the homogeneous rock between the shears appear to be a control of mineralization.

Alteration is complex, with ubiquitous propylitic alteration events overprinting an earlier, pervasive, potassic event. These alteration events precede the main mineralization, which is of several types. Stockwork gold veins with quartz, carbonate, pyrite, galena and sphalerite are as much as 50 feet wide and contain the bulk of the estimated tonnage.

### **A-J and Treadwell Mines**

Echo Bay Mines (85 percent) and WGM, Inc. (15 percent) continued intensive exploration of the A-J Mine beneath Roberts and Gastineau Peaks immediately behind Juneau. From 1901-1943 the A-J and Persistence Mines produced 3.3-million ounces of gold from 99-million tons of rock. This averaged 0.042 ounces of gold per ton from these mines that at peak production moved 13,000 tons of rock per day. Present plans would call for mining about 22,500 tons per day with a work force of about 450.

The A-J orebody is about three miles long, trending northwesterly and dipping about 65 degrees to the northeast. Like the Kensington and Jualin deposits 50 miles to the north, the A-J is localized along the Coast Range Megalineament. But instead of occurring in diorite, the A-J deposit occurs as vein swarms up to 15 feet thick near the contact of a footwall greenschist and hanging-wall metagabbro with black phyllite. Mineralization occurs from 2,500 feet above sea level to at least 1,300 feet below sea level and is accessed by tunnels and declines from the Sheep Creek Valley about four miles east of Juneau.

Present reserves at the A-J are 63.6 million tons of proven and probable ore with a grade of 0.052 ounces per ton, and 42.1 million tons of possible ore, grading 0.051 ounces per ton.

About a mile across the Gastineau Channel from the Echo Bay exploration office at Thane, the Treadwell deposit trends subparallel to the A-J, with a similar steep northeasterly dip. About 15.2 million tons of ore were mined to 2,300 feet below sea level, and exploratory work had been done at the 2,800-foot level when a massive collapse and inflow of water flooded the mine on April 20-21, 1917. The Alaska United Company and the Alaska Mexican Company mined an additional 12.2 million tons with an average grade of about 0.114 ounces per ton through 1922.

In 1990 Echo Bay Mines, Inc., drilled a 5,000-foot hole from the east side of the Gastineau Channel to intersect the Treadwell structure below the deepest working level. Results and current status of this hole are confidential, but wedge holes were reported. It seems possible that the deep levels of the Treadwell could be accessed by declines under the channel from the internal shaft of the A-J Mine.