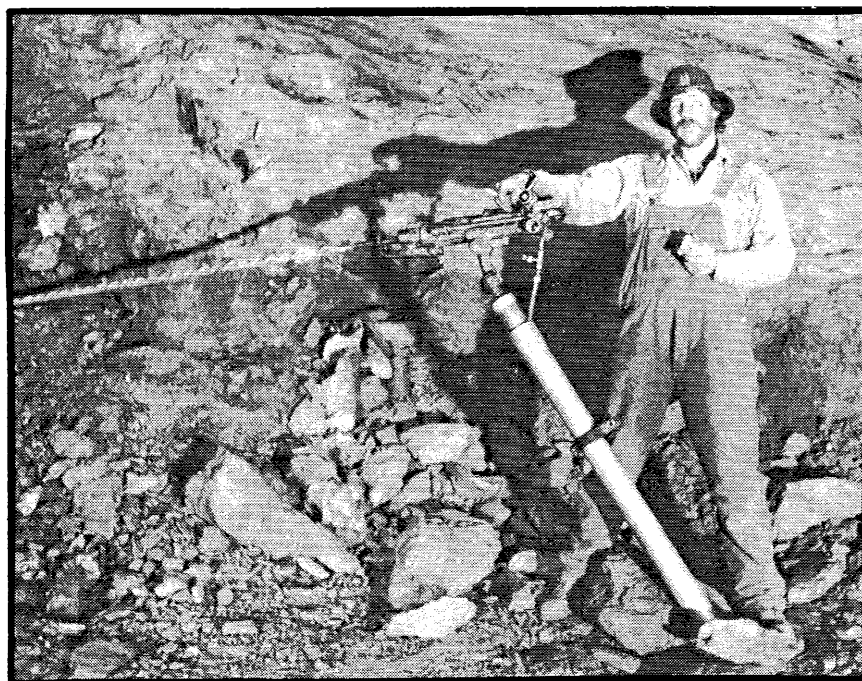


ALASKA'S MINERAL INDUSTRY 1991 Summary

- **Production**—up for gold, coal, zinc, and silver, but profits down for many mining firms because of low metal prices.
- **Reconnaissance exploration projects**—healthy.
- **Advanced exploration projects**—await development decisions.
- **Coal development**—new levels of interest in 1991.
- **Total mineral industry value**—\$620 million or about the same as 1990.
- **Employment**—remains at 3,650 (year-round-equivalent jobs).



By T.K. Bundtzen, R.C. Swainbank, J.E. Wood, and Albert Clough

DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

INFORMATION CIRCULAR 35
February 1992



Alaska Department of
**NATURAL
RESOURCES**

Alaska's Mineral Industry 1991: A Summary

by

T.K. Bundtzen,¹ R.C. Swainbank,² J.E. Wood,³ and A.H. Clough⁴

Preliminary estimate of the value of Alaska's mineral production for 1991 is \$554 million. This is an increase of 4 percent over the 1990 value of \$533 million, in spite of lower commodity prices. In 1991, Alaska produced nearly 65 percent of the U.S. domestic mine output of zinc, 20 percent of the silver, and about 10 percent of the lead. This production was mainly from concentrates shipped from the Red Dog and Greens Creek mines. Placer gold production stabilized, but fewer mines operated, due to low bullion prices, exhaustion of resources in some areas, and increasing regulatory requirements. Placer mining continues to be a

small-business oriented industry that provides many jobs to rural Alaskans. Mineral development expenditures increased from \$14.3 million in 1990 to \$24.6 million in 1991, an increase of 72 percent. However, mineral exploration activities softened with 1991 estimates reported at \$37.9 million, compared to 1990 estimates of \$63.3 million, a decrease of 40 percent. Several large advanced exploration projects await development decisions, which was a contributory factor in the exploration decline.

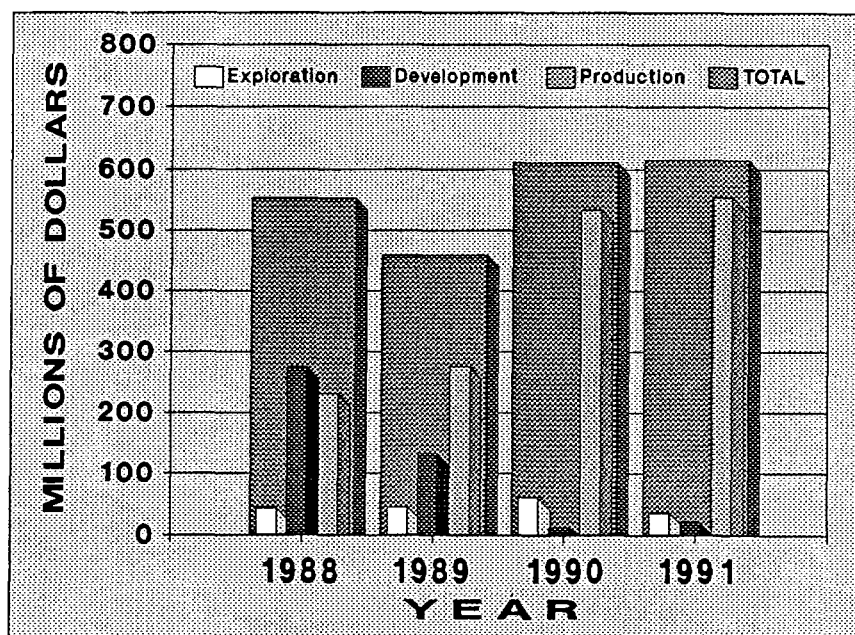
Total value of the Alaskan mineral industry as measured by value of production and the sum of

¹Alaska Department of Natural Resources, Division of Geological & Geophysical Surveys, 794 University Avenue, Suite 200, Fairbanks, Alaska, 99709-3645

²Alaska Department of Commerce and Economic Development, Division of Economic Development, 1001 Noble Street, Suite 360, Fairbanks, Alaska, 99701

³Alaska Department of Natural Resources, Division of Mining, 3700 Airport Way, Fairbanks, Alaska 99709

⁴Alaska Department of Commerce and Economic Development, Division of Economic Development, P.O. Box 11804, Juneau, Alaska, 99811



Alaska Mineral Industry Activity, 1988-1991

Cover photo: Paul Dionne of Inside-Out Mining Company, uses a jack-leg drilling component in underground drift mining on Nolan Creek in the Wiseman District of northern Alaska. Dionne mines during the winter, sluices in the spring, and conducts reclamation during summer months.

exploration and development expenditures was \$617 million, similar to the 1990 estimate of \$610 million (table 1).

The mineral industry provided about 3,640 year-round-equivalent jobs during the 1991 calendar year (table 2). These jobs are mining industry employment and do not include support or spin-off employment.

Legislation took effect on October 15, 1991, requiring reclamation of all lands currently mined in the State, regardless of land ownership. A reclamation bonding pool pioneered by the Alaska Division of Mining is now available for all mines on State, Federal, and private lands. In 1991, the State collected rents and net-royalty revenue on State mining claims as required by previously enacted statutes and regulations.

The Alaska Legislature and the Executive Branch made progress in resolving the Mental Health Lands dispute, which affects about 1 million acres (404,000 ha) of high value State lands. State and Mental Health plaintiffs are currently working on details of exactly how the trust lands will be reconstituted.

The Alaska Department of Natural Resources began a diligent resource assessment of eligible Federal lands to determine suitability for State ownership as part of the 1959 Alaska Statehood Act. Selections for Alaska's final 20 million acres of the total 104.5 million acre statehood entitlement will be submitted to the Federal government by January 1994. Mineral endowment is being evaluated by the Alaska Division of Geological & Geophysical Surveys staff.

Table 1. Total value of mineral industry in Alaska, 1989-91

	1989	1990	1991
Exploration	\$ 47,762,596	\$ 63,255,594	\$ 37,976,539
Development	134,272,350	14,326,500	24,574,350
Production	276,983,741	533,024,500	554,468,907
TOTAL	\$459,018,687	\$610,606,594	\$617,019,796

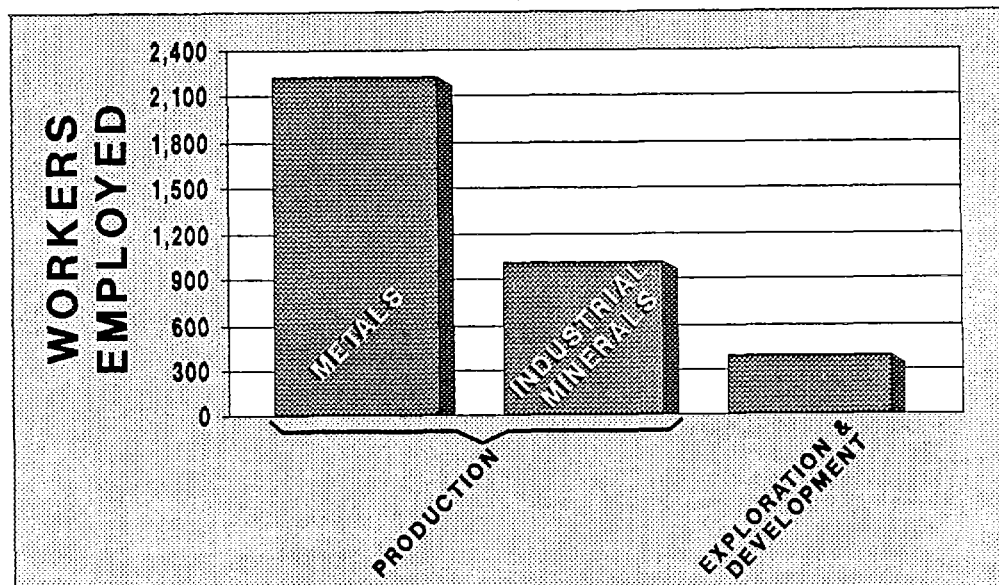
Table 2. Alaskan mine employment, 1989-91*

	1989	1990	1991
Gold/silver mining			
Placer	1,316	1,151	1,240
Lode	161	265	235
Base metals	407	425	415
Recreational	325	315	320
Sand and gravel	625	645	685
Building stone	148	160	165
Coal	120	115	115
Peat	--	--	45
Tin, jade, soapstone, ceramics, platinum	40	40	25
Mineral development	785	95	133
Mineral exploration	252	374	260
TOTAL	4,179	3,585	3,638

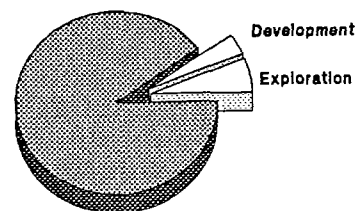
-- = Information not available.

*Calculated for 260-day workyear.

Mineral industry jobs, by category, 1991



PRODUCTION



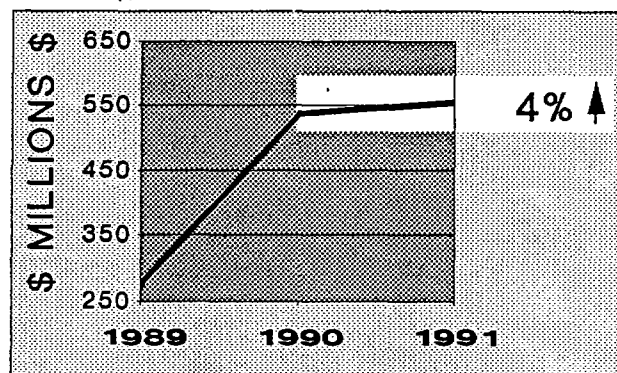
Production of metals accounted for nearly four-fifths of total mineral output for 1991 and increased in volume and value from the record setting 1990 calendar year (table 3). However, commodity price drops caused by the international economic recession resulted in only modest increases in monetary values from the previous year. For example, zinc, lead, silver, and gold dropped 28, 31, 21 and 6 percent, respectively, in value from 1990 levels which resulted in lower profit margins for most Alaskan metal mines.

Production continued to improve at the Red Dog Mine, in northwestern Alaska, owned by NANA Corporation and operated by Cominco Alaska Inc. From mid-summer to October 8, 1991, 521,404 tons (472,913 tonnes) of zinc, lead, and ISF composite-metal concentrates were shipped from the Port of Kivalina to various overseas markets and the Cominco smelter at Trail, British Columbia. Silver is also produced at the mine. The 1991 concentrate output increased 62 percent from the 321,700 tons (291,782 tonnes) of concentrate shipped to market in 1990. Zinc production at the Red Dog Mine accounted for nearly 60 percent of U.S. mine output, making Red Dog one of the world's largest producers of zinc.

Kennecott-Greens Creek Mining Company (KGCMC) mined zinc, silver, lead, and gold deposits at Greens Creek on Admiralty Island near Juneau for the third consecutive year. Production of about 7.6 million oz (236,360 kg) of silver, 37,000 oz (1,150 kg) of gold, and 58,750 short tons (53,286 tonnes) of combined lead and zinc was about the same level as 1990. Once again, KGCMC was the nation's largest silver producer, but low metal prices resulted in net operating losses for the 1991 calendar year. In order to improve profitability and overall economic viability during difficult times, KGCMC has

submitted a modified plan of operation to the U.S. Forest Service to upgrade the mill and improve the quality of mineral concentrate produced. These upgrades include the installation of two tower mills along with six column flotation cells. Researchers from the U.S. Bureau of Mines worked with KGCMC staff to implement a water gel-based explosive that successfully mitigated the problems with sulfide dust explosions which earlier plagued the project.

About 202 placer and two hard-rock mines produced an estimated 243,880 oz (7,585 kg) gold worth \$88.2 million, a 5 percent increase in volume of gold from 1990. Almost all of the increased gold production can be attributed to the resumption of full scale production of Cambior's Valdez Creek placer mine near Cantwell. Alaska Gold Company continued to operate two bucketline stacker dredges in the Nome district and employed 75 workers to strip overburden, thaw frozen ground, and operate the dredges. Other large operations statewide include Polar Mining near Fairbanks, NYAC Mining Company near Aniak, Tiaga Mining at Hogatza, Alaska Placer Development at Livengood, Sphinx-America Inc. near Ruby, GHD Resources at Candle and



Mineral production in Alaska

Table 3. *Estimated mineral production in Alaska, 1989-91**

Metals	Quantity			Estimated values*		
	1989	1990	1991	1989	1990	1991
Gold (ounces)	284,617	231,700	243,900	\$108,723,694	\$ 89,204,000	\$ 88,291,800
(kilograms)	8,852	7,206	7,585			
Silver (ounces)	5,211,591	10,135,000	10,176,854	27,360,852	50,675,000	41,114,490
(kilograms)	162,102	315,199	316,500			
Platinum (ounces)	W	--	15	W	W	5,325
(grams)	W	--	465			
Lead (tons)	9,585	44,220	69,591	7,672,009	30,954,000	33,403,680
(tonnes)	8,698	40,106	63,119			
Zinc (tons)	19,843	181,200	278,221	29,383,400	253,680,000	278,221,000
(tonnes)	18,007	164,350	252,346			
Mercury (pounds)	W	--	--	W	--	--
Tin (pounds)	194,000	57,000	6,800	672,000	200,000	22,100
(kilograms)	87,988	25,855	3,084			
Total				\$173,811,955	\$424,713,000	\$441,058,395
Industrial minerals, coal, and peat						
Jade and soapstone (tons)	57.0	W	16.0	\$ 1,140,000	\$ W	\$ 12,000
(tonnes)	51.7	W	14.5			
Sand and gravel (million tons)	14.4	15.0	14.4	39,875,000	40,821,500	45,448,512
(million tonnes)	13.1	13.6	13.1			
Building stone (million tons)	2.9	3.2	3.0	20,340,000	22,100,000	22,500,000
(million tonnes)	2.6	2.9	2.7			
Total				\$61,355,000	\$62,921,500	\$67,960,512
Coal (tons)	1,452,353	1,576,000	1,520,000	\$ 41,464,800	\$ 44,990,000	\$ 45,000,000
(tonnes)	1,317,574	1,429,000	1,433,060			
Peat (cubic yards)	51,000	65,000	75,000	352,000	400,000	450,000
(cubic meters)	38,995	49,699	57,345			
Total				\$ 41,816,800	\$ 45,390,000	\$ 45,450,000
TOTAL				\$276,983,755	\$533,024,500	\$554,468,907

*Production data from DCGS questionnaires, phone interviews with mine operators, Alaska Department of Transportation and Public Facilities, and other sources.

*Values calculated from 1991 annual price averages of gold (\$362/ounce), zinc (\$0.50/lb), lead (\$0.24/lb), silver, (\$4.04/ounce), platinum (\$355/ounce), and tin (\$3.25/lb) as published in the "Mining Journal"; other values supplied directly by mine operators. Coal-value estimates include some in-state freight costs.

-- = Not reported.

W = Withheld.

Shoreham Resources near Manley Hot Springs. A net loss of 16 mine operations—most of them placer mining firms—took place statewide. Lower prices, increasing regulatory oversight, and exhaustion of reserves in key districts continue to slow progress of Alaska's placer mining industry, which functions at about the same economic level as typical farming or rural commercial fishing enterprises.

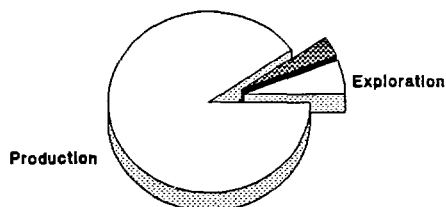
Usibelli Coal Mine Inc. produced about 1,520,000 short tons (1.37 million tonnes) of coal worth about \$45 million from its Poker Flats pit near Healy, Alaska. About half of the coal was used in six interior Alaska power plants while the remaining coal was shipped to the Korean Electric Power Company in South Korea through the Port of Seward. Arctic Slope Consulting Group mined

500 tons (454 tonnes) of bituminous coals at its Aluaq mine site north of Kotzebue and conducted home heating and plower plant tests of the coal.

The sand and gravel and building stone industries functioned at the same levels as in the past five years; about 14.4 million short tons (13.1 million tonnes) of sand and gravel worth \$45.6 million were produced by 41 companies on the North Slope, along the Rail Belt, and in the more remote areas of southeastern and southwestern Alaska. Respondents

indicated that increased demand for sand and gravel in the Anchorage and Fairbanks areas resulted in modest price increases for its products. However, sand and gravel consumption is expected to drop in 1992 unless new private or public construction projects are started, because current activities are nearly completed. Stone production estimates of about 3 million short tons (2.7 million tonnes) followed patterns similar to that of the sand and gravel industry.

DEVELOPMENT



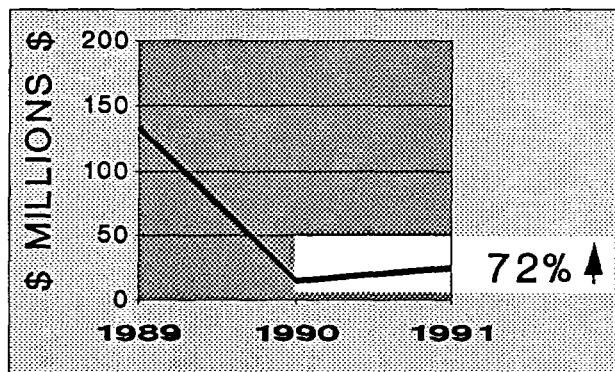
Alaskan mineral development expenditures increased from \$14.3 million in 1990 to \$24.6 million in 1991, an increase of nearly 72 percent and the number of jobs in mineral development increased from 95 to 133 (table 4). The increased activities are centered around anticipated large scale gold mining in the Fairbanks area, coal and placer gold development in the southcentral region, and development drilling and geotechnical analysis at the Greens Creek mine near Juneau.

Fairbanks Gold Inc. completed 32,600 feet (9,340 m) of RVC drilling at its Fort Knox deposit about 15 miles (24 km) northeast of Fairbanks. The geotechnical work during the year consisted mainly of "condemnation" drilling to ascertain where mill, tailings pond, and other infrastructure for a proposed mine are to be located. Fairbanks Gold has indicated that the Fort Knox deposits contain 3.2 million oz (99,520 kg) of gold in proven and probable categories within about 125 million short tons (113 million tonnes) of granite-hosted ore.

Late in the year AMAX Gold Inc. announced its intention of purchasing all assets of Fairbanks Gold Inc. in a stock transfer worth about \$150 million. AMAX Gold plans to continue development work on the property, acquire necessary permits,

conduct environmental assessments, and proceed toward a production in late 1994 or early 1995. Mine development costs are estimated at \$200 million. A work force of 250 would produce 300,000 oz (9,330 kg) of gold annually which would more than double current Alaskan gold production.

Coal development projects continued in northern, interior, and southcentral Alaska in spite of political and economic problems. Hobbs Industries Inc. (Hobbs) stopped development of the Castle Mountain mine north of Palmer because of



Mineral development in Alaska

Table 4. Reported mineral development expenditures and employment in Alaska, 1991

	Northern	Western	Eastern interior	South-western	South-central	Alaska Peninsula	South-eastern	TOTAL
Exploration Expenditures								
Base metals	\$ --	\$ --	\$ --	\$ --	\$ --	\$ --	\$ 4,000,000	\$ 4,000,000
Precious metals								
Placer	79,000	2,050,000	308,300	90,000	5,338,000	--	--	7,865,300
Lode	--	--	6,000,000	--	119,050	--	4,010,000	10,129,050
Coal and peat	--	--	--	--	2,318,000	--	--	2,318,000
Industrial minerals	--	110,000	150,000	--	--	--	2,000	262,000
TOTAL	\$79,000	\$2,160,000	\$6,458,300	\$90,000	\$7,775,050	\$ --	\$8,012,000	\$24,574,350
Exploration Employment								
Employment								
Workdays	633	940	12,613	290	14,405	--	6,700	34,680
Workyears ^a	2.4	3.6	24	1.1	44	--	10	133
Number of companies reporting ^b	3	2	10	1	9	0	3	28

-- = No expenditures reported.
^aBased on a 260-day workyear.
^bSome companies were active in several areas.

the Mental Health Lands injunction and the termination of the over-the-horizon (OTH-B) radar power plant project near Glenallen, which needed coal for fuel. Instead, after the Castle Mountain mine was delayed, Hobbs moved toward development of the nearby Evan Jones Mine. A new portal pad was constructed during 1991 and a multiplate culvert-type portal was emplaced at the face of the Number-3 coal seam. By year's end, a tunnel 79 feet (24-m) in length was driven using a Joy 12CM5 "continuous miner." Issues to be settled before Hobbs can put a mine into production include road access, bond payments, and market assurance.

Diamond Chuitna continued development and fulfilling permit requirements for its 330 million ton (299 tonnes) coal reserve in the Beluga Coal field northwest of Cook Inlet. Diamond Chuitna continues to examine potential Asian market opportunities for its sub-bituminous coal, which contains BTU and physical characteristics similar to coal produced by Usibelli Coal Mine.

During the last three years, Idemistu Alaska Inc. (IAI) has conducted extensive development of its proposed surface coal mine at Wishbone Hill near Palmer. In September 1991, IAI acquired the

requisite state coal mining permit for proposed operations. The Wishbone Hill project has been negatively affected by the Mental Health Lands litigation, which must be resolved before the mine can proceed toward production. Although the Asian market opportunities for steam coal have recently declined, IAI believes that mine construction could begin in 1994 or early 1995, if pending legal issues can be resolved. The mine plan calls for production of up to 1.5 million tons (1.36 million tonnes) of high quality bituminous coals annually, which would employ a year-round work force of 150-200.

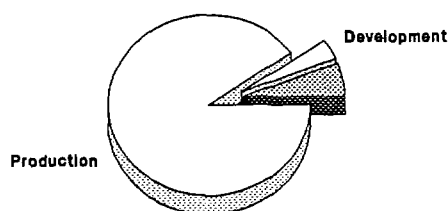
Usibelli Coal Mine Inc. (UCM) along with five other private and public organizations continued to work on the Healy Clean Coal Project (HCCP). The HCCP plant is estimated to cost \$194 million; about 50 percent of the cost will be supplied through a U.S. Department of Energy grant. The Alaska Industrial Development and Export Authority (AIDEA) administers the state investment. Golden Valley Electric Association will purchase the power and UCM will provide the coal. The project is proceeding toward beginning construction in the spring of 1993, with start-up testing of

plant facilities scheduled for late 1995. When completed, the HCCP plant is expected to generate 50 megawatts of electric power using state-of-the-art technologies designed to reduce sulfur, nitrogen, and particulate-matter emissions.

Arctic Slope Consulting Group conducted extensive coal marketing studies as part of its proposed development of the Aluaq mine in the

Deadfall Syncline area near Cape Beaufort. In 1991, the Alaska legislature awarded \$2 million to Arctic Slope Regional Corporation to continue the exploration and feasibility studies. Bulk samples were shipped to facilities in Pennsylvania and Taiwan for testing during the year. Export market possibilities include the Far East and Europe via a northern Arctic Ocean sea route.

EXPLORATION



Preliminary estimates of 1991 Alaska exploration expenditures show a decline from \$63.3 million in 1990 to \$37.9 million in 1991, in part caused by a shift in emphasis from drilling and mine planning to permitting at some of the previous years advanced exploration projects (table 5). Employment in exploration activities decreased from 374 jobs in 1990 to 260 in 1991. Poor international metal prices and mine profitability also influenced exploration investment in Alaska. Questionnaire responses providing exploration data have been received from 79 mining firms and consultants.

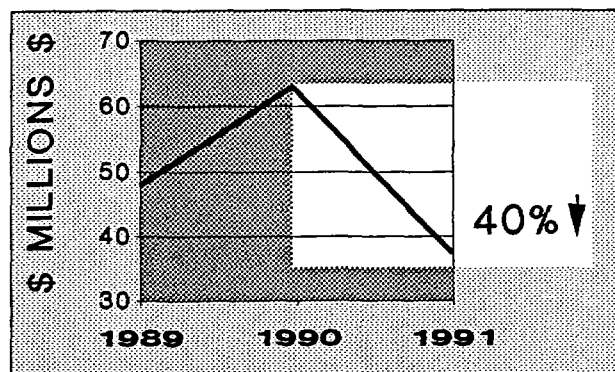
Major exploration projects in 1991 were reported by most of the larger companies which were active in 1990, including Cominco Alaska Inc., AMAX Gold Inc., Battle Mountain Exploration Co., North Pacific Mining Company, American Copper and Nickel Inc., Placer Dome U.S. Inc., La Teko Resources Ltd., Lac Minerals (USA) Inc., Echo Bay Alaska Inc., Arctic Slope Consulting Group, Central Alaska Gold Company, BHP Utah International, Pulsar Resources, and Kennecott Corporation.

Northern Alaska

Arctic Slope Consulting Group conducted a drilling program to delineate high-quality coal in the Deadfall Syncline area north of Kotzebue, and explored base metal properties in the De Long Mountains.

Western Alaska

Mineral exploration expenditures decreased 70 percent from 1990 to 1991 in western Alaska. Large hard-rock gold exploration efforts near Nome and Bluff were downsized or suspended causing most of the decline in expenditures. However, Bering Straits Native Corporation had an active year exploring the potential of the Bluff, Mt. Distin, Aurora Creek, and Gold Hill areas near Nome. Two of these projects were joint-venture arrangements. Kennecott explored base and precious metal deposits throughout the Seward Peninsula and continued work in the Sinuk River lead-zinc district near Nome.



Mineral exploration in Alaska

Table 5. Reported exploration expenditures and employment in Alaska by commodity and region, 1991

	Northern	Western	Eastern Interior	South-western	South-central	Alaska Peninsula	South-eastern	TOTAL
Exploration Expenditures								
Base metals	\$ 110,000	\$ 815,000	\$ 162,500	\$ 14,000	\$2,648,000	\$ --	\$ 1,040,000	\$ 4,789,500
Precious metals								
Placer	365,900	189,000	156,048	115,000	314,500	--	2,200	1,142,648
Lode	--	1,373,941	3,212,400	1,695,000	3,079,050	327,000	21,667,000	31,354,391
Coal and peat	450,000	--	--	--	153,000	--	--	603,000
Industrial minerals	30,000	--	5,000	--	--	--	52,000	87,000
Other	--	--	--	--	--	--	2,000	2,000
TOTAL	\$955,900	\$2,377,941	\$3,535,948	\$1,824,000	\$6,194,550	\$ 327,000	\$22,763,200	\$37,978,539
Exploration Employment								
Employment								
Workdays	3,701	2,866	7,815	2,932	13,712	345	35,235	66,606
Workyears	10	11	25	11	41	1.3	59	260
Number of companies reporting	8	10	23	8	18	2	10	79
-- = No expenditures reported.								

Aspen Exploration applied for permits to test-mine a gold deposit in the Sophie Gulch area north of Nome where nearly 6.7 million tons (6.04 million tonnes) grading 0.07 oz/ton (2.4 g/tonne) gold was identified by previous drill programs. One of the larger projects was at Illinois Creek where North Pacific Mining Corporation and Vinta Explorations Inc. drilled 5,130 feet (1,564 m) of HQ core to confirm reserves. The companies plan similar work in 1992 to prepare for a production decision.

Central Alaska Gold Co. (Central Alaska) had a small program at the (high-grade) Nixon Fork copper-gold-bismuth deposit northeast of McGrath. The company is seeking funds to bring the property into production. Central Alaska has identified about 375,000 oz (11,662 kg) gold and subordinate copper-bismuth credits in several high-grade ore bodies.

Eastern Interior Alaska

Exploration expenditure in interior Alaska declined from \$15.8 million in 1990 to \$3.5 million in 1991, a 78 percent decrease. Much of this decrease is attributed to the conversion of the Fort Knox project from an exploration to a development project.

There were two major exploration efforts on Ester Dome near Fairbanks during 1991—both for hard-rock gold. Gateway Mining Co., the new operator for La Teko Resources Ltd. Ryan Lode project, drilled 76,000 feet (23,170 m) to confirm reserves in the main northeasterly vein structure and in the sub-parallel Curlew-Irving structure to the south. The Curlew-Irving structure appears to be associated with a recently identified body of monzodiorite, with proven and probable reserves of 1 million tons (907,000 tonnes) of ore at 0.06 oz/ton (2.0 g/tonne) gold which could be mined open-pit at a 5:1 stripping ratio. The Ryan Lode has been confirmed to depths of about 1,000 feet (305 m) and proven and probable reserves are 3 million tons (2.7 million tonnes) grading 0.068 oz/ton (2.3 g/tonne) gold. These reserve estimates are based on the 1991 reverse-circulation drill program of 221 holes, on 100-foot (30.5-m) centers, which extended the known length of the Ryan shear zone to the northeast, almost to the Grant Mine property boundary.

Gateway Mining also initiated a program for neutralizing about 300,000 tons (272,100 tonnes) of spent leach pads and impoundment waters from previous mining operations by Citigold Alaska Inc.,

and contracted with Inco Exploration and Technical Services Inc., a subsidiary of Inco Ltd., to use the Inco SO_2 /air cyanide destruction process. This method was extremely effective in reducing the cyanide and contained metals in the pond water to near drinking-water quality in a very short time. More cyanide-neutralization work is expected to continue in 1992.

Following up on an airborne geophysical survey and regional exploration conducted in 1990, American Copper and Nickel Co. (ACNC) mounted an aggressive exploration effort on the remainder of Ester Dome during 1991. ACNC continued to explore the Grant Mine vein system in a joint venture with Silverado Mines Ltd. Results of this exploration show the O'Dea Vein extends southwest toward the Ryan Lode. By year's end, 15 separate gold targets had been defined on a 14-mi² (36-km²) area of Ester Dome, and some of the targets had been sampled by drilling. Rock assay values up to 0.37 oz/ton (12.5 g/tonne) gold were reported from one area of silicified schist and brecciated, silicified, sulfide-bearing intrusive rocks. ACNC has pioneered reclamation of former producing open-pit mines and exploration trenches on Ester Dome, and has won praise from local residents of Ester Dome for its efforts.

ACNC was also actively exploring for similar targets at Eagle Creek north of Fairbanks. AMAX Gold Exploration Inc. had an exploration program near Pedro Dome, northeast of the town, in addition to a large program at the Liberty Bell Mine near Healy.

Tri-Valley Corporation, in an innovative joint venture with TsNIGRI (Central Research Institute of Geologic Prospecting for Base and Precious Metals) of Moscow, had a nine-man Russian field crew in the Richardson district about 70 miles (112 km) east of Fairbanks during most of the summer. TsNIGRI had proposed using an Antonyev-AN2 biplane to conduct airborne geophysical surveys before beginning field work, but objections by the Department of Defense have delayed the deployment of the aircraft in Alaska. It is hoped that this problem can be resolved in 1992. The professional dedication exhibited by the Russian team drew admiration from visiting Alaskan minerals geologists and mining engineers.

Southwest Alaska

In southwest Alaska, Cominco had a substantial drilling program at its Pebble Copper deposit

west of Newhalen and north of Iliamna Lake in the Alaska Peninsula region. Reserves are estimated to be 241 million tons (219 million tonnes) of 0.4 percent copper and 0.012 oz/ton (0.4 g/tonne) gold, with a higher grade central zone containing 50 million tons (45 million tonnes) grading 0.5 percent copper with 0.015 oz/ton (0.5 g/tonne) gold.

Placer Dome U.S. Inc., together with Central Alaska Gold Company completed a large drilling project at Vinasale Mountain about 18 miles (29 km) south of McGrath. Two deposits contain an estimated 1 million oz (31,100 kg) of gold in a Late Cretaceous alkali-calcic pluton, similar to lodes known in the Iditarod-Flat and Donlin districts. Battle Mountain Exploration Co. prospected for gold in the Moore Creek area and Beaver Mountains west of McGrath.

Southcentral Alaska

Exploration activity in southcentral Alaska increased 170 percent from 1990, with total expenditures for 1991 estimated at \$7.5 million. North Pacific Mining Corporation (NPMC) was active in regional exploration. In joint venture with Cathedral Gold Co. and Pacific Sentinel, NPMC had a substantial regional exploration program on the west side of Cook Inlet to seek targets judged to be analogous to those in the Eskay Creek/Iskut River area of northwestern British Columbia. In the same area in another NPMC joint venture, Hunt, Ware and Proffett continued exploration of the Johnson River gold-zinc deposit.

Placer Dome U.S. Inc. diamond-drilled a new deposit at Deadman Mountain, where Cominco Alaska Exploration recently discovered a high-grade gold-quartz vein in schist south of the Denali Highway.

Alaska Peninsula and Aleutian Islands

Battle Mountain Exploration Co. continued its work on the Alaska Peninsula and the Aleutian Islands. Most effort went into prospects on Unga Island, where the company conducted an auger-drilling program to test the epithermal precious metals potential.

Southeast Alaska

In southeast Alaska, Echo Bay Alaska Inc. continued with permitting and environmental work on the Alaska-Juneau (A-J) Mine, near Juneau, and prepared for construction start up. The draft Environmental Impact Statement (EIS) was released

in January 1991. The final EIS is in preparation and should be released by early spring, 1992. Announced proven and probable reserves at this former gold producer are 68 million tons (61.6 million tonnes) of 0.052 oz/ton (1.8 g/tonne) gold, with 33.4 million tons (30.3 million tonnes) grading 0.048 oz/ton (1.6 g/tonne) gold as possible ore. These tonnages exceed Echo Bay's threshold limits for mine development; therefore, no additional exploration work is being conducted prior to a production decision.

Fifty miles (80 km) north of Juneau, Echo Bay continued drilling and underground development at the Kensington Mine, a 50-50 joint venture with Coeur Alaska Inc. By November 1992, estimates for all categories of ore reserves at the Kensington had been increased to 11.5 million tons (10.4 million tonnes) grading 0.143 oz/ton (4.7 g/tonne) gold. The Kensington draft Environmental Impact Statement was released in June 1991. The final EIS should be released in early 1992. Underground work on the property continues in an effort to increase the ore reserve base. Of note is the exploration of the relatively new so-called "Horrible" ore body offsite from the main Kensington vein system. The Horrible deposit contains an additional inferred reserve of 3.93 million tons (3.56 million tonnes) grading 0.11 oz/ton (3.7 g/tonne) gold, which is not included in reserve estimates given above.

The Jualin Mine, near the Kensington project, was actively explored by Placer Dome U.S. Inc. in 1991. The mine was under option from International Curator and Granges and property owner Hyak Mining of Juneau. Drill programs on this gold property have totaled more than 80,000 feet (24,390 m) since exploration began in 1987.

Placer Dome relinquished its option on the property by year's end. Work-to-date on the Jualin Mine indicates a gold resource of 1.07 million tons (970,000 tonnes) with an uncut grade of 0.349 oz/ton (11.8 g/tonne) gold. With these relatively favorable results, it is expected that work will continue on the property in 1992.

On Admiralty Island, about 18 miles (29 km) southwest of Juneau, the Kennecott Greens Creek Mining Co. increased estimates at reserves at the Greens Creek Mine, (all categories), to about 13.0 million tons (11.8 million tonnes) with grades approximating present mine-run ore, which averages 9.7 percent zinc, 4.37 percent lead, 0.18 oz/ton (6.1 g/tonne) gold and 24 oz/ton (816 g/tonne) silver. This substantial increase in known reserves resulted from drilling in both 1990 and 1991.

The Southeast Alaska Native Regional Corporation, Sealaska, conducted gold and industrial mineral exploration on Prince of Wales and Dahl Islands, west of Ketchikan. Klukwan Inc., the Haines Village corporation, initiated mineral development on its land holdings. Also, Metlakatla Natives are seeking partners for exploration and mineral development on their land, southwest of Ketchikan.

Major established companies, Kennecott, Cominco, and Hecla, all had modest exploration efforts in the panhandle. Juneau-based Hyak Mining and Alaska-Dano Mines explored on northern Admiralty Island and Chichagof Island.

U.S. Borax sold its patented claims at the Quartz Hill Molybdenum deposit, near Ketchikan, to Cominco for an undisclosed amount. Cominco has not announced any development schedule for the property. Quartz Hill is estimated to contain 10 percent of the world's known molybdenum reserves.

GOVERNMENT ACTIONS

Regulations regarding rents and royalties were in effect for all of 1991, and the reclamation statute became effective for all mines on October 15, 1991. A bonding pool has been formed through the Alaska Division of Mining and is available to operators on all classifications of land in Alaska.

The executive branch has worked diligently with plaintiffs of the 1985 Weiss vs. State of Alaska lawsuit, which demanded resolution of many issues surrounding the Alaska Mental Health Land Trust. Options reviewed during the year include establishment of a pool of lands selected for high resource potential or reestablishment of the Mental Health Lands as originally designated.

Another issue that would be a deterrent to mineral development, the municipal taxation of in-place resources, received attention during the year. The Alaska Department of Community and Regional Affairs (DCRA), which was legislatively charged to study the in-place taxation issue and

report findings and recommendations back to the Alaska Legislature by 1992, has recommended that in-place natural resources be permanently exempted from municipal taxation. This recommendation echoes the conclusions and recommendations of other State agencies (Departments of Commerce and Economic Development, Natural Resources, and Revenue) and the Alaska Municipal League.

At the beginning of 1991, State mining claims numbered 30,467. The State billed these claims for the \$.50/acre annual fee, with the typical claim bill being \$20 for a 40-acre (16-ha) claim. Holders of 27,231 claims made payment by the November 30 deadline; non-payment for 3,236 claims reverted these claims to open status. However, during 1991 approximately 3,540 new claims were staked on State lands. The 30,467 active State claims in January 1991 compares with 24,500 Federal mining claims.

Authors' note: *"Alaska's Mineral Industry 1991: A Summary," is a preliminary report of the status of the industry through the 1991 calendar year. It is prepared for decision makers, the news media, mineral firms, and others who require an early synopsis of industry activity. We will publish the comprehensive annual report in late summer 1992.*

We gather the information for the Mineral Industry Report through questionnaires sent to individuals and companies in the industry, from interviews with mine operators, from government agencies, and from published summaries. As we publish this preliminary summary, not all questionnaires for this year's report have been returned; we anticipate receiving more information through April.



STATE OF ALASKA
Walter J. Hickel, *Governor*

DEPARTMENT OF
NATURAL RESOURCES
Harold C. Heinze, *Commissioner*

DIVISION OF GEOLOGICAL &
GEOPHYSICAL SURVEYS
Thomas E. Smith, *Director*
and *State Geologist*

DIVISION OF MINING
Sam Dunaway, *Acting Director*

DEPARTMENT OF COMMERCE AND
ECONOMIC DEVELOPMENT
Glenn A. Olds, *Commissioner*

DIVISION OF ECONOMIC
DEVELOPMENT
Diane Mayer, *Acting Director*

This publication is available at the following locations.
Address mail orders to the Fairbanks office.

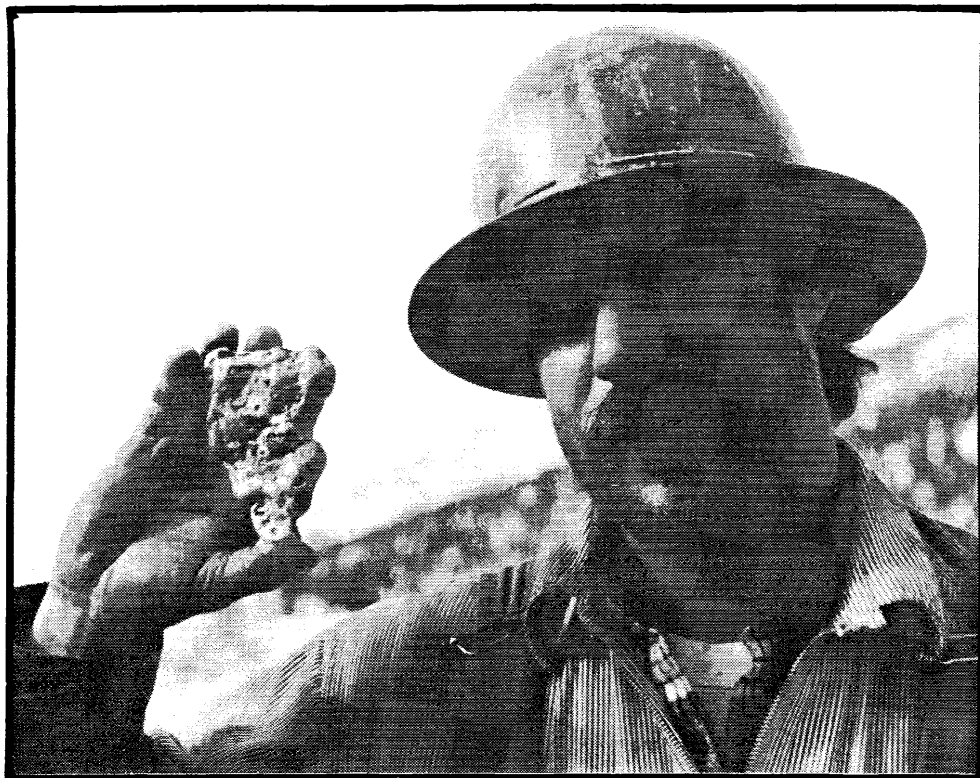
Alaska Division of Geological & Geophysical Surveys
794 University Avenue
Suite 200
Fairbanks, Alaska 99709-3645

400 Willoughby Avenue
(3rd floor)
Juneau, Alaska 99801

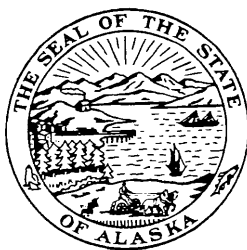
U.S. Geological Survey Earth Science Information Center
605 West 4th Avenue
Room G84
Anchorage, Alaska 99501-2299

4230 University Drive
Room 101
Anchorage, Alaska 99508

This publication, released by the Division of Geological & Geophysical Surveys, was produced and printed in Fairbanks, Alaska. Publication is required by Alaska Statute 41, "to determine the potential of Alaskan land for the production of metals, minerals, fuels, and geothermal resources; the location and supplies of groundwater and construction materials; the potential geologic hazards to buildings, roads, bridges, and other installations and structures; and shall conduct such other surveys and investigations as will advance the knowledge of the geology of Alaska."



Paul Dionne holds a 22 3/4 oz nugget that was mined from an underground drift mining operation in the Wiseman District of northern Alaska.



DEPARTMENT OF NATURAL RESOURCES

Division of Geological & Geophysical Surveys

Division of Mining

DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT

Division of Economic Development