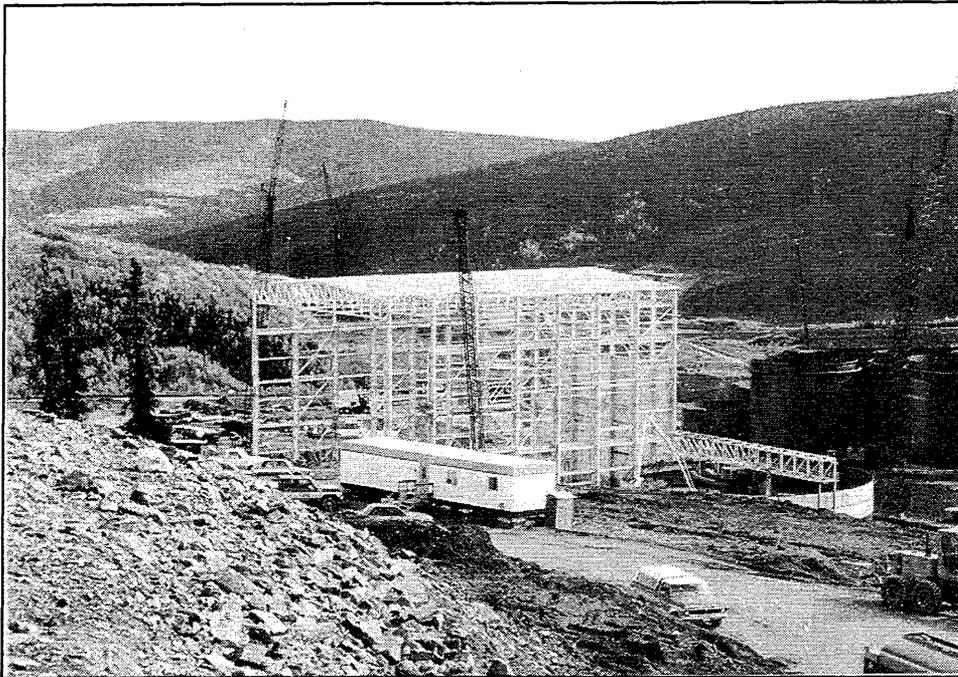


Alaska's Mineral Industry 1995: A Summary

by T.K. Bundtzen, R.C. Swainbank, A.H. Clough, M.W. Henning, and K.M. Charlie



Mine construction at the Fort Knox project. When the mine is in production in the fourth quarter of 1996, it will be Alaska's largest gold mine. Photo by R.C. Swainbank.

PRODUCTION—In 1995 production gross value of Alaska's mineral industry increased 6 percent to \$539.5 million. Red Dog zinc, lead, and silver mine became the world's largest producer of zinc. Gold production was down by 25 percent from 1994 levels.

DEVELOPMENT—Expenditures reached \$147.8 million in 1995, up 234 percent from 1994 levels. The main reasons for the increase were mine expansion at Red Dog and mine construction at Fort Knox and Nixon Fork.

EXPLORATION—Grass-roots exploration spending increased 9 percent statewide to \$34.0 million with the greatest increase in the Eastern Interior Region.

EMPLOYMENT—With about 3,405 full-time-equivalent jobs, mineral industry employment was up 10 percent from 1994 levels.

GOVERNMENT ACTIONS—Governor Knowles signed an exploration incentive bill. U.S. Bureau of Mines was dissolved. Eleven firms received reclamation awards.

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RESOURCES**

ALASKA MINERAL INDUSTRY 1995: SUMMARY

by T.K. Bundtzen,¹ R.C. Swainbank,² A.H. Clough,³ M.W. Henning,⁴ and K.M. Charlie⁵

INTRODUCTION

This report summarizes mineral industry activity of the 1995 calendar year. Much of the information it contains is based on a Department of Natural Resources (DNR) questionnaire sent to approximately 985 companies, individuals, and government agencies involved in mineral extractive industries. We anticipate that more questionnaire information will be returned and added to the data base before release of the final report later this summer. As in past years, DNR produced the summary in cooperation with the Department of Commerce and Economic Development (DCED).

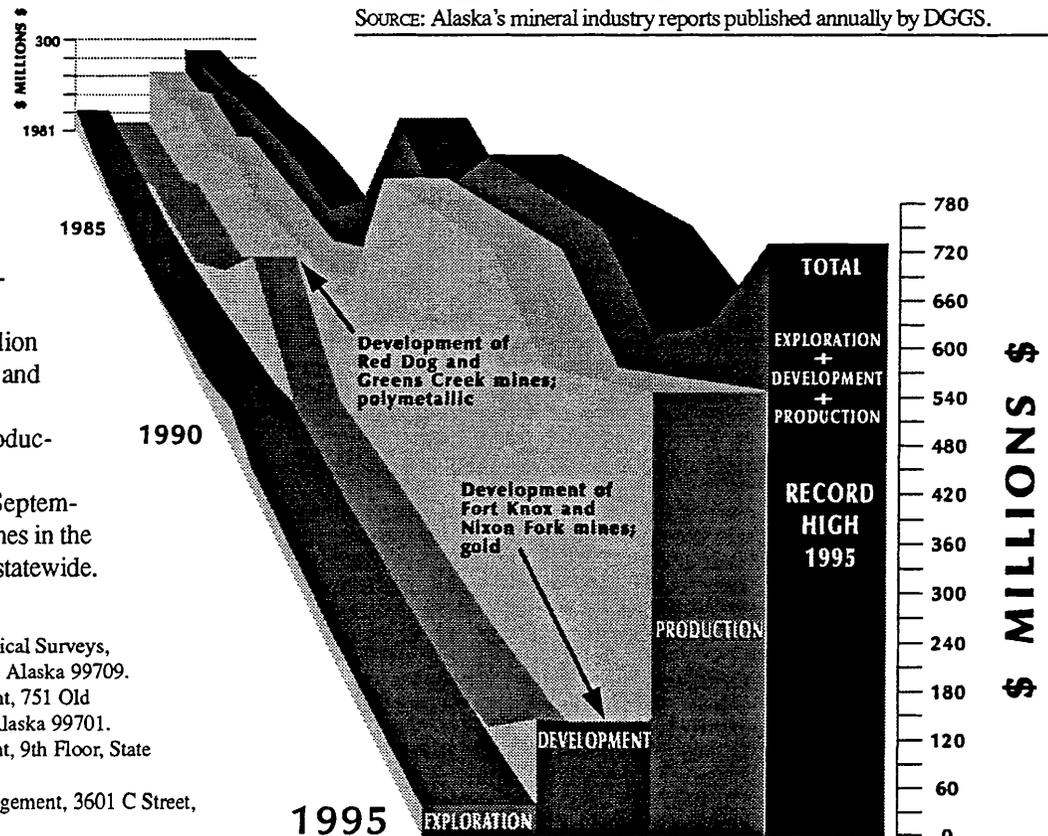
In 1995, there were many signs of continued growth and change in the Alaska mineral industry. The gross value of Alaska mineral production is estimated at \$539.5 million, up 6 percent from the 1994 estimate of \$507.5 million (table 1). Two factors were responsible for the production increases: (1) a 15 percent increase in lead and zinc concentrate shipments from the giant Red Dog lead, zinc, and silver mine in northwest Alaska, and (2) a record 1,640,000 tons (1,487,808 tonnes) of coal production from Usibelli Coal mine in the Eastern Interior Region.

However, gold production decreased from 182,100 ounces (5,663 kilograms) worth \$70.3 million in 1994 to 137,342 ounces (4,271 kilograms) worth \$54.3 million in 1995, or a decline of 25 percent and value decline of 18 percent. Major contributing factors to the gold production declines were the closing of Cambior's Valdez Creek Mine in September 1995 coupled with further declines in the total number of active placer mines statewide.

Table 1. Total value of the mineral industry in Alaska by year (in millions of dollars)

	Exploration	Development	Production	Total
1981	\$76.0	\$26.4	\$188.6	\$291.0
1982	45.0	41.6	196.4	283.0
1983	34.1	27.8	232.4	294.3
1984	22.8	53.6	199.4	275.8
1985	9.2	34.1	226.6	269.9
1986	8.9	24.3	198.5	231.7
1987	15.7	100.3	202.4	318.4
1988	45.5	275.0	232.2	552.7
1989	47.8	134.3	277.0	459.1
1990	63.3	14.3	533.0	610.6
1991	39.9	25.6	546.5	612.0
1992	30.2	30.0	560.8	621.0
1993	30.3	27.7	448.7	506.7
1994	31.1	44.9	507.5	583.5
1995	34.0	147.8	539.5	721.3
Total	\$533.8	\$1,007.7	\$5,089.5	\$6,631.1

SOURCE: Alaska's mineral industry reports published annually by DGGS.



Alaska mineral industry total value in millions of dollars, 1981-95.

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Nixon Fork hardrock deposit began producing gold and copper by mid-October. Nixon Fork mine is projected to produce 60,000 ounces (1,866 kilograms) of gold in 1996, which should soon help make up for some of the production losses occurring in placer mining. Industrial mineral output (building stone, ornamental stone, and sand and gravel) declined from \$68.0 million in 1994 to \$57.2 million in 1995. This decrease reflected declines in logging road and urban highway construction projects.

Exploration and development expenditures from 98 projects ballooned from \$76.0 million in 1994 to \$181.8 million in 1995, an increase of 139 percent. Increased levels of grass roots exploration programs, coupled with full-scale mine construction at the Fort Knox and Nixon Fork hardrock gold mines, caused the large increase in Alaska mine investments.

The total value of the Alaska mining industry, as measured by the sum of exploration and development expenditures and the value of production, was \$721.3 million in 1995, compared with \$583.5 million in 1994, an increase of 24 percent (table 1).

The Alaska mineral industry provided an estimated 3,405 direct, full-time-equivalent jobs in 1995, an increase of 322 or 10 percent from 3,083 mining jobs in 1994 (table 2). Most of the added job opportunities can be attributed to expansion at the Red Dog zinc, lead, and silver mine and to the Nixon Fork and Fort Knox gold development projects. Contrasting these increasing job opportunities were employment declines in placer gold and industrial mineral operations.

The Alaska Department of Natural Resources continued its airborne geophysical surveys in the Rampart-Manley area in 1995. The project products—reports, maps, and computer disks—are being released to the public in early March 1996.

In June 1995 Alaska Governor Tony Knowles signed HB 197, an exploration incentive bill that provides 100 percent

credit for qualifying exploration costs from future mining licenses, corporate taxes, and state royalties on mineral production.

The longstanding Alaska Mental Health Lands litigation, which halted leases and transfers of millions of acres of state-owned mineralized lands, reached an interim solution in January 1995.

The Alaska Department of Natural Resources presented reclamation awards to nine placer mining firms and two hardrock firms. The State of Alaska will continue to present annual awards to mining companies for exemplary work in returning mined lands to useful condition.

PRODUCTION

The value of 1995 Alaska mineral production is estimated at \$539.5 million, an increase of \$32.0 million or a 10 percent increase above the 1994 value (table 3). Metals continued to dominate mineral production and accounted for 82 percent of 1995 Alaska mineral industry value. Overall value for metals increased from \$402.2 million in 1994 to \$440.9 million in 1995, a 9 percent increase. Zinc and lead output accounted for 70 percent of the total value of all Alaska mineral products.

Metals

Cominco Alaska Inc. milled 2,485,900 tons (2,255,200 tonnes) of zinc, lead, and silver ore at the Red Dog mine in northwest Alaska. Cominco shipped 645,100 tons (585,200 tonnes) of zinc concentrate, 101,300 tons (91,900 tonnes) of lead concentrate, and 7,200 tons (6,500 tonnes) of bulk concentrate from the port of Kivalina north of Kotzebue to overseas and Canadian smelters. In 1995 Red Dog mine became the world's largest zinc producer and accounted for 8 percent of the world's mine-produced zinc. Increased capacity of grinding circuits in the mill was the main reason concentrate production increased by 95,600 tons (86,728 tonnes) or by 14.5 percent from 1994. Improvements in the quality of lead and zinc concentrates resulted in improved metal recoveries during refining.

Approximately 79 percent of the 397 workers on the Red Dog payroll are Alaska residents; 50 percent are shareholders in NANA Corporation, owner of the ore deposit. Because sea-ice conditions prevented timely delivery of diesel fuel to the Port of Kivalina, Cominco contracted with Everts Air of Fairbanks to haul fuel to the Red Dog mine during the spring and summer of 1995.

In 1995 Alaska gold mines produced an estimated 137,342 ounces (4,271 kilograms) of gold worth \$54.3 million, a decrease in weight of about 25 percent and in value of 18 percent from 1994 levels. The loss of gold output from several large placer mines and with the continuing erosion in the number of placer mine operations statewide contributed to this production decline. Based on DGGS questionnaires and DNR Alaska Placer Mining Application (APMA) submittals, the overall

Table 2. Alaska mine employment, 1990-95^a

	1990	1991	1992	1993	1994	1995
Gold/silver/mining						
Placer	1,151	1,240	1,251	1,205	1,150	975
Lode	N/A	N/A	N/A	N/A	- -	38
Polymetallic	265 ^b	35 ^b	240 ^b	26	- -	
Base metals	350	331	349	376	311	397
Recreational	315	320	325	270	280	255
Sand & gravel	645	685	640	580	640	580
Building stone	160	165	145	205	210	200
Coal	115	115	115	109	115	120
Peat	N/A	45	40	49	55	30
Tin, jade, soap-stone, ceramics, platinum	40	25	20	20	25	20
Mineral development	95	133	164	132	115	633
Mineral exploration	374	268	137	164	182	157
TOTAL	3,510	3,562	3,426	3,136	3,083	3,405

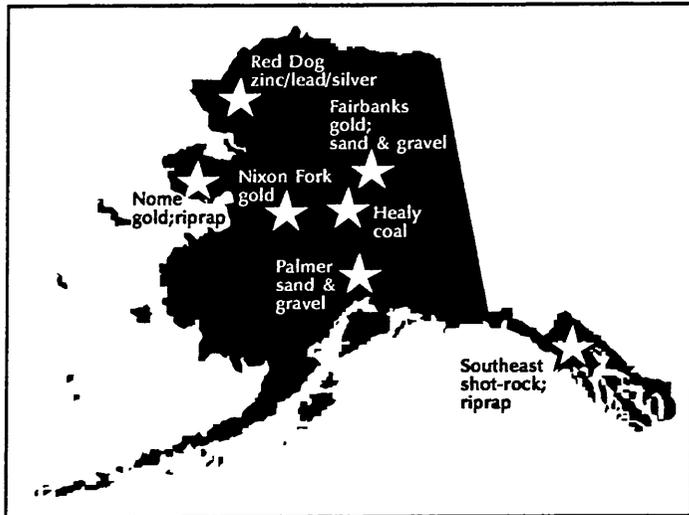
^aCalculated on a 260-day work year.

^bRevised estimate based on new company data.

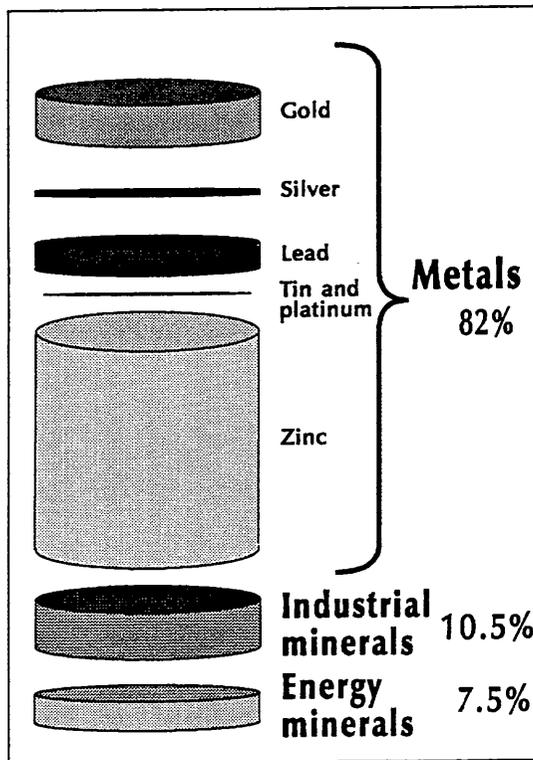
N/A = Not available.

- - Not reported

number of mechanized placer mines decreased about 22 percent from 185 in 1994 to 145 in 1995. One lode mine, the Nixon Fork mine, produced gold in the fourth quarter of the year. Despite significant declines, placer mines employed 975 people, which is 29 percent of all mining jobs statewide, and provided many employment opportunities in remote rural Alaska.



Selected significant mine production sites in Alaska, 1995.



Production value distribution by commodity.
Estimated value of Alaska mineral production for 1995 totaled \$539.5 million.

Cambior Alaska Inc. operated the Valdez Creek placer gold mine, about 55 miles (89 kilometers) east of Cantwell. The mine again provided about 150 full-time jobs and produced 32,750 refined ounces (1,018 kilograms) of gold worth \$12.9 million from approximately 0.86 million cubic yards (0.66 million cubic meters) of pay gravel. The Valdez Creek placer mine has been Alaska's largest gold producer for 11 of the last 12 years; however, due to exhaustion of reserves, Cambior ceased all mine operations on September 24, 1995. There are no plans to reopen the mine.

Since 1987, Cambior Alaska has recontoured and reseeded 1,276 acres (516 hectares) of land that had been disturbed by placer mining activities in the Valdez Creek drainage. The tailings ponds collecting mine waters before 1992 were reclaimed as wetlands and are used by migratory waterfowl. In 1995, relocating Valdez Creek to its original flow required construction of about one mile (1.5 kilometer) of channel. The final pit is now a lake 2,800 feet long by 1,000 feet wide (853 meters by 305 meters wide) that has been recontoured with an accessible shoreline. Because of these efforts, the State of Alaska presented a 1995 Governor's Award for mine reclamation to Cambior Alaska Inc., the same company that received the 1994 Governor's Mine Safety Recognition Award.

Alaska Gold Company mined 19,000 ounces (591 kilograms) of gold from open pit operations in the Nome district. Both Dredge 5 and Dredge 6, which were previously the company's principle gold producers, were placed in mothball status.

Polar Mining Inc. again operated its large open pit placer gold mine on Lower Goldstream Creek on a year-round basis. During the year the company moved 3,600,000 cubic yards (2,752,560 cubic meters), and washed 505,000 cubic yards (386,123 cubic meters) of pay gravel. The company expects to finish the lower Goldstream paystreak by August 1996, and move mine operations to another large placer deposit on upper Goldstream Creek below Gold Dredge 8, about 13 miles (21 kilometers) east of its present location.

On October 22, 1995 Nixon Fork Mining Company began milling hardrock copper and gold ores that averaged 1.51 ounces per ton (51.7 grams per tonne) gold and 2.2 percent copper. By December the mine had sold 6,213 ounces (193 kilograms) of gold derived from dore bar and sulfide concentrate sales. Concentrates containing gold and copper were shipped to Anchorage on Woods Air Service enroute to Dallo Inc. of Kosaka, Japan.

The 10 largest Alaska gold mines, not necessarily in order, are: Cambior Alaska Inc., Valdez Creek district; Alaska Gold Company, Nome district; Polar Mining Inc., Fairbanks district; Nixon Fork Mining Company, McGrath district; Alaska Placer Development, Livengood-Tolovana district; Silverado Mines (U.S.) Inc., Koyukuk-Nolan district; Little Eldorado Group, Fairbanks district; Clark-Wiltz Partnership, Innok district; Green Mining and Exploration, Ruby-Poorman district; and Girdwood Mining Company, Girdwood district. These companies produced 96,499 ounces (3,001 kilograms) of gold or 70.3 percent of the total 137,342 ounces (4,271 kilograms) of gold produced statewide.

Coal and Peat

Value of coal and peat rose from \$37.2 million in 1994 to \$41.5 million in 1995, an increase of 12 percent. Usibelli Coal Mine Inc. (UCM) mined a record 1,640,000 tons (1,487,808 tonnes) of subbituminous coal from the Poker Flats and Gold Run pits near Healy. Approximately 919,429 tons (843,106 tonnes) of the total was shipped through the port of Seward by Suneel Alaska Corporation to the Korean Electric Power Company (KEPCO) power plant in Honam, South

Korea. Eleven Panamax freighters were involved in transporting the coal throughout the year. The remaining 720,571 tons (653,702 tonnes) provided fuel for the Fairbanks Municipal Utilities System, the University of Alaska Fairbanks, Fort Wainwright Army Base, Eielson Air Force Base, Golden Valley Electric Association, and Clear Air Force Station. These Interior Alaska power plants collectively generate about 155 megawatts of electric power. UCM's Korean export agreement benefited from rising international coal prices.

Table 3. *Estimated mineral production in Alaska, 1993-95^a*

Metals	Quantity			Estimated values ^b		
	1993	1994	1995	1993	1994	1995
Gold (ounces)	191,265	182,100	137,342	\$ 68,640,800	\$ 70,290,600	\$ 54,250,090
(kilograms)	5,948	5,663	4,271			
Silver (ounces)	5,658,958	1,968,000	1,225,730	24,333,519	10,391,040	6,655,714
(kilograms)	175,994	61,205	38,120			
Platinum (ounces)	3	5	NR	1,235	2,065	NR
(grams)	95	158	NR			
Lead (tons)	38,221	36,447	58,530	13,759,560	25,512,900	34,428,600
(tonnes)	34,667	33,065	53,098			
Zinc (tons)	268,769	329,003	359,950	236,516,720	296,102,700	345,552,000
(tonnes)	243,774	298,472	326,547			
Tin (pounds)	21,000	W	W	50,610	W	W
(kilograms)	9,526	W	W			
Subtotal				\$343,302,444	\$402,229,305	\$440,886,404
Industrial minerals						
Jade and soapstone (tons)	2.6	2.3	2.0	\$ 20,000	\$ 20,000	\$ 25,000
(tonnes)	2.4	2.1	1.8			
Sand and gravel (million tons)	13.2	13.5	11.8	40,636,815	40,950,651	35,627,066
(million tonnes)	11.9	12.3	10.7			
Building stone (million tons)	3.6	3.8	3.0	26,205,784	27,038,008	21,505,000
(million tonnes)	3.3	3.5	2.7			
Subtotal				\$ 66,862,599	\$ 68,008,659	\$ 57,157,066
Energy minerals						
Coal (tons)	1,586,795	1,490,000	1,640,000	\$ 38,103,600	\$ 36,750,000	\$ 41,300,000
(tonnes)	1,439,223	1,351,730	1,487,808			
Peat (cubic yards)	72,000	87,900	35,000	445,000	439,500	157,500
(cubic meters)	55,051	67,208	26,761			
Subtotal				\$ 38,548,600	\$ 37,189,500	\$ 41,457,500
TOTAL				\$448,713,643	\$507,497,464	\$539,500,970

^aProduction data from DGGs questionnaires, phone interviews with mine or quarry operators, Alaska Department of Transportation and Public Facilities, and federal land management agencies

^bValues for selected metal production based on average prices for each year; for 1995—gold (\$395/ounce); silver (\$5.43/ounce); zinc (\$0.48/lb); lead (\$0.34/lb). All other values provided by mine operators.

NR = Not reported.

W = Withheld.

Two companies mined 35,000 cubic yards (26,761 cubic meters) of peat for horticulture applications in the Fairbanks and Wasilla areas.

Industrial Minerals

Value of industrial mineral production declined from \$68.0 million in 1994 to \$57.2 million in 1995, a 16 percent decrease (table 3). Factors contributing to the 1995 decline were general lack of sand and gravel use on the North Slope, declining levels of construction of logging roads as reported by the U.S. Forest Service and Native corporations, and fewer highway construction projects. Mine construction projects at the Fort Knox and Nixon Fork projects accounted for nearly 40 percent of stone production statewide.

Sound Quarry Inc. of Nome excavated 58,747 tons (53,295 tonnes) of riprap for use in erosion control projects in Alaska coastal areas. Both Calista and Bristol Bay Native Corporations sold large volumes of sand and gravel for use in construction projects throughout their corporation regions.

Sealaska Corporation shipped about 700 tons (635 tonnes) of limestone to a circum-Pacific buyer to test market applications.

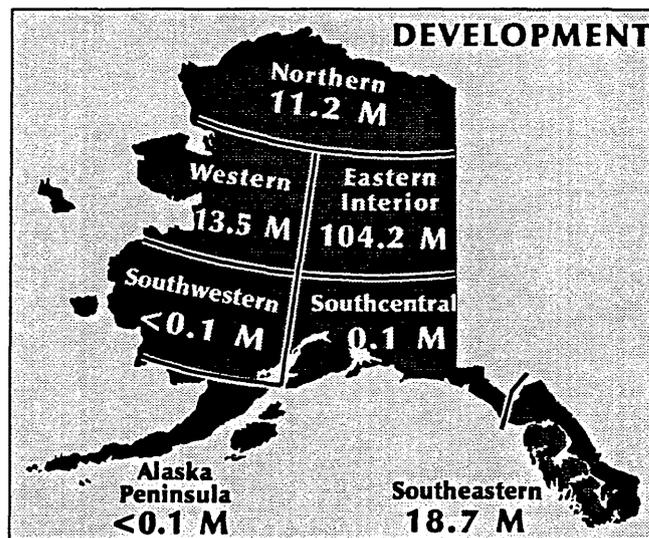
DEVELOPMENT

Alaska mineral development expenditures totaled \$147.8 million in 1995 (table 4), compared with \$44.9 million in 1994, a 234 percent increase. Mine construction work at the Red Dog mine and gold projects at Nixon Fork and Fort Knox

accounted for 86 percent of the total 1995 statewide development expenditure.

Northern Region

At the Red Dog mine Cominco Alaska completed a major mill upgrade program that began in 1993. Capital expenditures



Regional distribution of development dollars for 1995. Statewide total expenditures for development were \$147.8 million.

Table 4. Reported mineral development expenditures and employment in Alaska, 1995

	Northern	Western	Eastern interior	South-central	South-western	Alaska Peninsula	South-eastern	Total
Development expenditures								
Base metals	\$11,200,000	--	--	--	--	--	--	\$11,200,000
Polymetallic	--	--	--	--	--	--	9,590,000	9,590,000
Precious metals								
Placer	--	--	724,000	98,750	38,000	--	53,000	913,750
Lode	--	13,540,000	103,300,000	--	--	--	9,000,000	125,840,000
Coal and peat	--	--	200,000	--	--	--	--	200,000
Industrial minerals	--	--	25,000	20,000	--	10,000	--	55,000
Other								
Total	\$11,200,000	\$13,540,000	\$104,249,000	\$118,750	\$38,000	\$10,000	\$18,643,000	\$147,798,750
Development employment								
Employment								
Workdays	12,400	8,528	120,765	567	121	150	22,156	164,687
Workyears ^a	48	33	464	2	0.5	0.5	85	633
Number of companies reporting ^b	1	1	15	6	2	1	4	30

-- Not reported.

^aBased on 260-day workyear.

^bSame companies were active in several areas.

during 1995 totaled \$11.2 million and included installation of (1) a 1.2 million gallon fuel tank at the port, (2) a new lead flotation column, (3) two new zinc flotation columns, (4) an extension of the Red Dog Creek diversion, and (5) a modification to the tailings disposal line. As a result of these improvements concentrate production from the mill increased by 14 percent.

Western Region

Nixon Fork Mining Company, the operating subsidiary for Consolidated Nevada Goldfields Co., brought the Nixon Fork gold and copper mine 20 miles (32 kilometers) northeast of McGrath into production in October 1995. Mine construction activities included: (1) installation of new runway capable of landing aircraft as large as a Boeing 737 jet aircraft, (2) construction of tailings dam and water containment system, (3) completion of a 165 ton per day (149 tonne per day) ball mill, (4) completion of a 50-man camp facility, and (5) preparation of underground stopes for mine production. A L100C-130 Hercules aircraft made 75 trips to fly mine equipment and accommodations from Anchorage and Fairbanks to the mine site.

The mill began operations on October 1, direct mine feed was produced on October 6, and the first dore bar was poured at the mine site on October 22. During November the mine produced 4,500 ounces (128 kilograms) of gold and shipped to Kosaka, Japan, 22 tons (20 tonnes) of sulfide concentrates that assayed 33 ounces per ton (1,130 grams per tonne) gold and 6 percent copper. Concentrate shipments from the mine site to Palmer will continue on an every-other-week basis.

Actual project costs were approximately 1 percent over a projected budget of about \$13.35 million. Alaska-based subcontractors working on the Nixon Fork project included Wilder Construction, Golder and Associates, Lyntech Services, and Arctic Catering.

USMX Inc. continued development of a heap-leaching gold project at Illinois Creek about 150 miles (240 kilometers) southwest of Galena. The company drilled several wells for hydrological baseline studies and constructed a new access road linking the proposed pit with the airport and campsite. The company also participated in many permitting meetings.

Eastern Interior Region

In January 1995, Fairbanks Gold Mining Inc. selected Morrison and Knudsen as the general contractor for construction of the Fort Knox Gold Mine, 15 miles (23 kilometers) northeast of Fairbanks. In March, Kiewit Pacific Company was selected to complete the earthwork, and heavy equipment was on the job site prior to highway load restrictions that were imposed during spring breakup. By June the first pour of concrete from the on-site batch plant was emplaced at the fresh water dam keystone. By August, installation of cyanide vat-leaching tanks was completed, and by October, most of the mill buildings were enclosed. At the end of the year, bench configurations of the ore body were underway. During the peak of

construction activities in August, an estimated 720 workers were employed on the mine site. Golden Valley Electric Association (GVEA) started construction of a 32-mile-long (51-kilometer-long) powerline from Ester substation to the mine site and was about 55 percent complete by the end of the year.

The Fort Knox gold mine, which is scheduled to be in production by the fourth quarter of 1996, is designed to mine and mill 13,120,000 tons (11,900,000 tonnes) of ore and produce 330,000 ounces (10,263 kilograms) of gold annually. Due to stringent environmental controls required by state and federal agencies, Fairbanks Gold Mining Inc. will be operating the processing plant as a zero discharge facility.

Construction of the Healy Clean Coal Project (HCCP) began in 1995. The project is designed to develop 50 megawatts of electric power for GVEA by burning about 300,000 tons (270,600 tonnes) of coal. The Alaska Industrial Development and Export Authority (AIDEA), which has financed and will own the HCCP facility, provided \$69.6 million in advanced funding. The Alaska legislature provided a grant of \$25 million in 1990, and the U.S. Department of Energy provided \$117.3 million as part of a nationwide program to provide cleaner energy. The total cost of the project has been estimated to be \$267 million. In 1995, H.C. Price submitted the low bid of \$83.2 million for general construction of the plant and commenced work in the first quarter of the year. Throughout the summer, about 150 workers were employed at the HCCP work site near Healy. The HCCP facility will operate in a demonstration mode in 1998 and begin commercial production of electric power in 1999.

Southcentral Region

Several placer mining firms including Lake Creek Placers, Empire Exploration Inc., Arnold Echola, Crow Creek Mining, and Orofino Mining reported various levels of development work on placer properties throughout the Southcentral Region.

Southwestern Region

Little Creek Mine, Clark-Wiltz Partnership, and Misco-Walsh Mining Company conducted road construction, metallurgical tests, and plant modifications on both placer and lode gold deposits in the Southwestern Region.

Alaska Peninsula Region

Bristol Bay Native Corporation began development of several gravel deposits for future production.

Southeastern Region

Kennecott Greens Creek Mining Company completed development-level drifting and diamond drilling into the new southwest ore body at the Greens Creek zinc, silver, gold, and lead mine on Admiralty Island, 18 miles (29 kilometers) west of Juneau. Kennecott announced in November that it would invest \$87.0 million to bring the Greens Creek Mine, which was mothballed in 1993, back into production by January 1997. By the end of 1995, about 100 employees were working at the mine site.

Coeur d'Alene Mines Inc. bought out Echo Bay Alaska's interest in the Kensington project 42 miles (67 kilometers) north of Juneau for \$32.5 million. The Kensington project, as defined by Coeur, contains over 1.96 million ounces (60,963 kilograms) of gold in the proven and probable categories. The mine, if developed, is projected to last 12 years, with a workforce of 250 mining at a rate of 4,000 tons (3,628 tonnes) per day by long-hole open-stopping. The workers will rotate through an on-site camp, with access to Juneau by helicopter. Annual production is expected to be 259,000 ounces (8,056 kilograms). Ore will be beneficiated by flotation augmented by carbon-in-leach processing. Tailings will be contained in the valley of Sherman Creek. Coeur has relocated the Kensington mine discharge point from Berners Bay (marine outlet) to a freshwater stream. Local fisherman and environmental groups had strenuously opposed the former marine discharge design. Coeur hopes to have the Kensington project fully permitted by mid-1996.

Echo Bay Alaska continued development drilling and permit-level activities at the A-J Mine near Juneau. In May 1995, the U.S. Environmental Protection Agency (EPA) announced that it would investigate the merits of an alternative submarine tailings disposal, which had previously not been considered for the project.

EXPLORATION

Reported expenditures for exploration in 1995 were up 9 percent to \$33.97 million from the \$31.1 million for the previous year (table 5). Although exploration was reported in most areas of the state, as in the past few years exploration investment was greatest in the Southeast Region, followed by the Eastern Interior Region.

In June the Governor signed into law exploration incentives legislation that will allow deduction of up to \$20 million in exploration expenditures from taxes on new mines for up to 15 years. The credits for exploration are fully transferable from one property owner to the next. In September the State of Alaska contracted for a detailed airborne geophysical survey in the Rampart-Manley area of central Alaska; the results are expected in early March 1996.

Northern Region

Reported exploration expenditures in the Northern Region in 1995 were \$3.97 million, almost the same as was reported in 1994. However, in 1995 most of the activity was directed toward base metals and polymetallics (base metals with gold or silver) in this region. In 1994 the emphasis was on precious metal deposits.

In late July Cominco Alaska Inc. announced the discovery of a new deposit that lies only 1,500 feet (450 meters) north of the Red Dog mine. Although mineralization in the North Extension area was previously known, based on the results of reconnaissance drilling completed years ago, it was thought not

to be economic. The first of five holes of 1995 cut 610 feet (186 meters) of 15 percent zinc and 3 percent lead between 65 feet and 675 feet (20 and 206 meters). Cominco announced that the preliminary estimate of the North Extension—renamed the Aqqaluk deposit—is 84 million tons (76 million tonnes) averaging 13.7 percent zinc, 3.6 percent lead and 1.9 ounces per ton (65.2 grams per tonne) of silver. The combined indicated reserve of the Red Dog Mine, the inferred reserve of the Aqqaluk deposit, and the probable resource of nearby Hilltop Deposit is 152 million tons (138 million tonnes) with a grade of 16.2 percent zinc, 4.4 percent lead, and 2.4 ounces per ton (82.3 grams per tonne) silver.

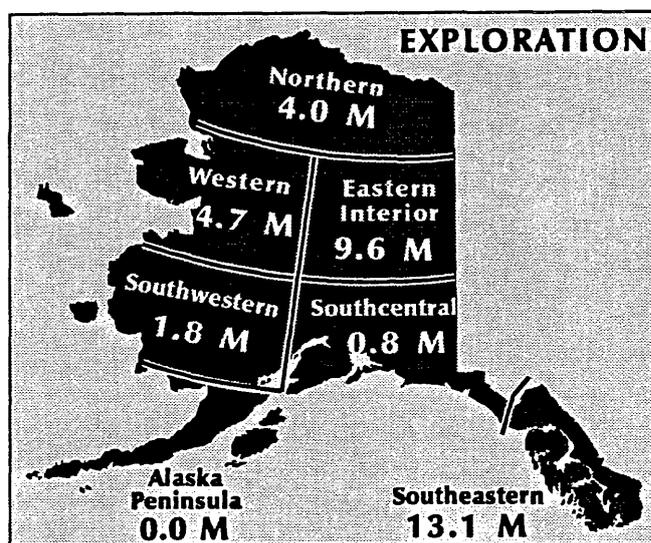
The airstrip at Bornite in the Kobuk Valley was active in 1995 and was used as the base of operations for two exploration camps in the Ambler copper belt. Kennecott conducted geophysical surveys in the vicinity of the Bornite deposit, near the Arctic camp. Teck Exploration continued work on the massive sulfide prospects it staked in 1994.

The Chandalar Lake area was also active in 1995, with several dozen new claims staked during the winter by Hamlyn Estates Inc.

Silverado Mines (U.S.) Inc. continued exploration of both placer and hardrock targets in the Nolan Creek Valley near Wiseman in the Brooks Range. In late August on the Slisco Bench in the Hammond River Valley, Silverado found grades of up to 0.3 ounces per cubic yard (7.2 grams per cubic meter) in a deep channel several hundred feet above the existing river levels. The company drilled 65 holes with a total of more than 5,000 feet (1,524 meters) of reverse-circulation drilling.

Western Region

Exploration investment in the Western Region declined in 1995 to \$4.73 million from the \$6.53 million reported in 1994.



Regional distribution of exploration dollars for 1995. Statewide total expenditures for exploration were \$34 million.

Polymetallic targets received even more attention than those containing only precious metals.

Alaska Gold Co. operated a small exploration program in conjunction with development and mining of its open-pit operation. Placer deposits were explored by Northwest Land Resources and Tolstoi Mining near McGrath.

Kennecott Exploration Co. continued to explore and evaluate the land area that belongs to the Bering Straits Native Regional Corporation and the Sitnasuak Native Village Corporation. Kennecott followed up on anomalies identified by the state geophysical survey and drilled during the winter in the Snake River lowlands and at the Rock Creek deposit to the east. The company drilled large-diameter holes at Rock Creek to learn more about the "nugget effect" of the coarse gold in the deposit.

Beginning in January, USMX Inc. held meetings with various state and federal agencies to scope out the possible problems associated with mining and reclamation of its proposed heap-leach operation at the Illinois Creek deposit. An agreement had been signed with the owner North Pacific Mining Co. which allowed USMX to acquire majority control of the Illinois Creek operation. USMX had an active exploration program at Illinois Creek during the 1995 season with more than 16,000 feet (4,878 meters) of reverse-circulation drilling, and almost 8,000 feet (2,440 meters) of diamond drilling with one hole intercepting 35 feet (10.7 meters) of 0.88 ounces per ton (30.19 grams per ton). The company plans to use a C-133 aircraft to transport some of the larger equipment to the mine site.

Exploration continued at the Consolidated Nevada Goldfields Corporation gold-copper mine at Nixon Fork, concurrent with mine development. In mid-December the company finalized an agreement to lease 46,000 acres (18,616 hectares) of private land near the mine from the Doyon Ltd. Native Regional Corporation for \$4 million. Consolidated Nevada Goldfields plans to spend about \$2 million in exploration during 1996.

Eastern Interior Region

Reported exploration investment in the Eastern Interior Region was \$9.6 million in 1995, an increase of 18 percent over the \$6.5 million reported the previous year. Precious metal targets accounted for most of the exploration.

During the winter of 1994-95 several hundred new mining claims and prospecting sites were staked in the Fairbanks district, partly in response to the successful exploration program at the True North prospect, partly due to the development of the Fort Knox Mine, and partly due to the airborne geophysical survey flown for the state in 1994. Major participants were Newmont Exploration Ltd., La Teko Resources Ltd., Placer Dome U.S. Inc., Fairbanks Gold Mining Inc., and Silverado Mines (U.S.) Inc. Smaller firms were also active exploring the Fairbanks area.

At the Fort Knox Mine most of the 1995 activity was in mine development, but Fairbanks Gold Mining Inc. also staked a large group of claims to consolidate its holdings in the vicin-

ity. The company also drilled the Gil East prospect about 6 miles (9 kilometers) northeast of the Fort Knox Mine. This prospect has a geochemical signature similar to the Fort Knox deposit, which contains 175 million tons of 0.024 ounces per ton gold (159 million tonnes at 0.82 grams per tonne), with minor bismuth, tellurium, and tungsten. However, the Gil East prospect is metamorphic rock rather than a granite and contains more arsenic. Most of the drill intercepts were about 50 feet (15.4 meters) of about 0.03 to 0.04 ounces per ton (1.0-1.4 grams per tonne), but one contained 130 feet (42.7 meters) of 0.11 ounces per ton (3.77 grams per tonne).

The True North property is located about 15 miles (24 kilometers) north of Fairbanks, and about 8 miles (12.8 kilometers) west-northwest of the Fort Knox Mine. It is hosted in the Chatanika Terrane, a sequence of coarse-grained mica schists, carbonaceous quartzites, and calcareous eclogitic rocks. The Chatanika Terrane was thought until recently to be devoid of any potential for large, low grade gold deposits. At the end of 1994, reserves in two discrete deposits, the Shepard and Hindenburg, stood at 446,000 ounces (13,872 kilograms) of gold. Newmont Mining Company began negotiations with La Teko in March and signed a document in June, which allowed it to join in a joint venture with the True North property. Newmont crews cut the first trenches on True North in June, and started the first phase of a reverse-circulation drill program. About 15,000 feet (4,572 meters) of reverse-circulation drilling, about 13,000 feet (3,962 meters) of core drilling and about 6,300 feet (1,920 meters) of trenching on the property in 1995 indicate that the Shepard and Hindenburg prospects are part of a 5,200 by 2,600 feet (1,585 by 793 meters) zone of continuous mineralization. As of October 12, the external perimeter of the mineralization had not been determined. One drill hole, TN315, intercepted 35 feet of 1.22 ounces of gold per ton (10.7 meters of 41.9 grams per tonne). At year end, Newmont made a \$1 million payment to La Teko as part of the buy-in agreement, whereby Newmont can earn up to a 65 percent interest in the property.

During the 1994-95 winter Placer Dome U.S. Inc. began staking prospecting sites east and south of the True North property and drilled 5,094 feet (1,553 meters) of core during the winter to investigate the relationship between the Chatanika Terrane rocks and the Cleary Sequence rocks to the southeast. The prospecting sites were converted to claims in May, and Placer Dome conducted a close-spaced airborne geophysics survey during the summer. Placer Dome also flew a 110-square-mile (285-square-kilometer) airborne survey near Livengood, about 80 miles (128 kilometers) north of Fairbanks, and optioned ground held by Alaska Placer Development Inc. as part of a subregional exploration program.

Silverado Mines (U.S.) Inc. acquired a large group of claims called the Marshall Dome prospect (formerly the Golden Slipper group) south of the Placer Dome U.S. holdings, and continued exploration through freeze-up. Silverado had earlier added about 5 square miles (13 square kilometers) of claims to

Table 5. Reported exploration expenditures and employment in Alaska by commodity and region, 1995

	Northern	Western	Eastern interior	South-central	South-western	Alaska Peninsula	South-eastern	Total
Exploration expenditures								
Base metals	2,275,000	--	560,000	--	--	--	--	2,835,000
Polymetallic ^a	1,320,000	2,465,000	1,940,000	700,000	360,000	--	3,090,000	9,875,000
Precious metals-								
Placer	375,000	260,000	217,600	46,000	35,000	--	111,000	1,044,600
Lode	--	2,000,000	6,876,000	55,000	1,315,000	--	9,015,000	19,261,000
Coal and peat	--	--	--	--	--	--	--	--
Industrial minerals	--	--	--	--	51,000	--	900,000	951,000
Other	--	--	--	--	--	--	3,000	3,000
Total	3,970,000	4,725,000	9,593,600	801,000	1,761,000	--	13,119,000	33,969,600
Exploration employment								
Employment								
Workdays	4,362	9,922	8,414	4,022	538	0	13,581	40,839
Workyears ^b	17	38	32	16	2	0	52	157^c
Number of companies reporting ^d	6	7	28	7	10	0	10	68

-- No expenditures reported

^aJade, platinum, gemstones.

^bBased on 260-day workyear.

^cSmall discrepancy on total due to rounding

^dSame companies active in more than one area.

its holdings on Ester Dome west of Fairbanks, and continued ground geophysics and soil-sampling throughout the summer and fall.

La Teko Resources Ltd. announced in March that it had staked 16,000 acres (6,475 hectares) in the Chatanika Terrane, about 15 miles (24 kilometers) northeast of its True North property, where the conductivity response was similar to that of the True North property. On the first day of staking this block, called the Juniper Creek prospect, a piece of float was found that assayed 0.247 ounces per ton (8.5 grams per tonne) gold. During the summer field season La Teko found several stream sediment and soil gold anomalies in the area and will continue exploration in 1996.

On August 31 La Teko announced that it has optioned its Ryan Lode Mine to a joint venture between KLS Enviro Resources, Inc. and Nevada Star Resources Corporation for 90 days to fund and complete a prefeasibility study.

Avalon Development Co. drilled about 10,000 feet (3,048 meters) on an altered granodiorite on the ridge between the Tolovana and Cleary Hill Mines adjacent to International Freegold's Mineral Development Inc.'s Golden Summit property. The intrusive contains abundant veinlets of arsenopyrite and pyrite. The first phase of drilling had several interesting intercepts, including 330 feet of 0.049 ounces per ton (108 meters of 1.68 grams per tonne) gold in the discovery hole

and 90 feet of 0.067 ounces per ton (27 meters of 2.3 grams per tonne) gold in another. Avalon reported a second phase of drilling in the late fall delimited the mineralized area.

About 120 miles (192 kilometers) southeast of Fairbanks the WGM/Sumitomo as a joint venture core-drilled about 13,000 feet (3,962 meters) and ran about 40 line-miles (64 kilometers) of geophysical survey. Sumitomo Metal Mining Co. announced that 9 of 13 holes found gold mineralization and that the prospect has high potential for development. One hole contained 630 feet (192 meters) of 0.032 ounces gold per ton (1.1 gram per tonne) from the surface to depth. Hole 7 contained 27 feet of 0.32 ounces per ton (8.2 meters of 11.0 grams per tonne) at a depth of 684 feet (208 meters), and hole 9 had 22.6 feet of 1.84 ounces per ton gold (6.9 meters of 63.1 grams per tonne) at a depth of 600 feet (183 meters).

For the first time in several years hardrock drilling was reported in the Circle district, 100 miles (160 kilometers) northeast of Fairbanks. One target was on the Joker and 88 claims, an area of gold-bearing quartz stringers within an altered granite, a few miles south of the Circle Hot Springs. On the second target, Alpine Exploration Co. drilled about 1,400 feet (427 meters) of a reverse-circulation hole in Gold Dust Creek to explore veins found during earlier placer mining.

American Copper & Nickel Co. (ACNC) had an aggressive exploration program known as the Delta Belt project in the

eastern Alaska Range, in the old Tok mining district. This area contains numerous polymetallic prospects. ACNC contracted for an airborne geophysical survey to help in the exploration effort. Late in the year ACNC staked a large block of mining claims covering about 60 square miles (155 square kilometers) in an area west of Paxson. The claims contain abundant basic and ultrabasic rocks that are thought to be the source of many copper, nickel, and platinum anomalies. Paxson is about 80 miles (128 kilometers) south of Delta Junction.

Southcentral Region

Exploration investment in this area in 1995 was reported to be \$801,000, down substantially from the \$1.6 million spent during the previous year.

The largest program in this region was that of Westmin Resources Ltd. It continued exploration and geotechnical drilling at the Johnson River prospect on the west side of Cook Inlet and has been following up on geophysical anomalies in the area.

Several placer mines reported minor exploration programs in the Petersville-Collinsville area, at Girdwood, and in the Palmer area.

In May 1995, North Pacific Mining Inc. announced that it will be taking over the lease on the Wishbone Hill coal mine from Idemitsu-Alaska Inc. for undisclosed considerations. This high-rank coal lease, which contains about 15 million tons (13.6 million tonnes) of minable material, is located in the Matanuska Coalfield near Palmer, about 40 miles (64 kilometers) northeast of Anchorage.

Late in the year Nerox Power Systems Inc. announced that it will enter into a joint venture with Hobbs Industries to develop the Evan Jones Mine in the same coalfield, with the intent of selling the coal to Glencore Ltd., an international brokerage company. The recent increased interest in Alaska coal is the result of the rise in the international benchmark price for coal, coupled with the demand for coal in the Pacific Rim that has been forecast.

Southwestern Region

Exploration expenditures in southwest Alaska in 1995 were \$1.76 million, double those of the previous year, due mainly to the activity of Placer Dome U.S. Inc.

In Anchorage, in June, Placer Dome U.S. Inc. announced that it would mount a \$1 million exploration program on Calista Native Regional Corporation lands at Donlin Creek north of Crooked Creek on the Kuskokwim River. Placer mounted an aggressive 18,522 foot (6,117 meter) core-drilling program, and late in the year began construction of an airstrip suitable for C-130 Hercules-type aircraft and planned to continue the program in 1996. Donlin Creek is one of a series of prospects and properties associated with Late Cretaceous felsic dikes and sills intruded into Cretaceous flysch within a 500-mile-long (805-kilometer-long) belt through the Kuskokwim Mountains and possibly into the Livengood area. Gold is associated with

arsenic, antimony, and mercury sulphides within the felsic intrusives, and is often concentrated at the margins. Previous work at Donlin Creek by West Gold Inc. suggested a resource of about 380,000 ounces (11,819 kilograms) of gold with grades of about 0.088 ounces per ton (3.02 grams per tonne).

Southeastern Region

As in the past few years, there was more exploration reported in the Southeastern Region than any other in Alaska. The \$13.12 million invested in 1995 was a substantial increase from the \$10 million invested in 1994. Most of the activity was at the A-J, Kensington, and Greens Creek Mines near Juneau. Abacus and Sealaska also had active programs on Prince of Wales Island.

Throughout much of 1995 Echo Bay Alaska carried out a major reassessment of the A-J project. This followed detailed geologic and engineering investigations and re-analysis of the ore deposit, combined with difficulties encountered in permitting the original mining proposal. The process will continue in 1996. Based upon the newly developed data, Echo Bay has announced a draft revised mine plan. The original plan called for using large open stopes mining 22,500 tons (20,400 tonnes) per day. The draft revised plan uses sublevel caving, a more selective mining method, at a rate of 15,000 tons (13,600 tonnes) per day. These changes are the result of more complete understanding of the ore deposit geometry. The draft revised plan also calls for the removal of the cyanide circuit from the mill flowsheet, with most of the gold reporting to the gravity circuit. The flotation concentrate will be shipped offsite for beneficiation.

Echo Bay is also investigating tailing disposal alternatives that include submarine disposal and upland dry tailings disposal. In order to explain the significance of these changes and successfully obtain permits for the revised project, Echo Bay has been working with the U.S. Environmental Protection Agency (EPA) and State of Alaska resource agencies and has commissioned the preparation of a Supplemental Environmental Impact Statement (SEIS). CH2M Hill, a disinterested third party, is preparing the SEIS under the direction of EPA, and is expected to have completed it by late 1996.

Greens Creek is a zinc, lead, silver, and gold volcanogenic massive sulphide mine on Admiralty Island about 20 miles (32 kilometers) west of Juneau. Current reserves are listed at 8.661 million dry short tons of 0.169 ounces per ton gold (7.85 million tonnes at 5.8 grams per tonne gold), 20.26 ounces per ton silver (695 grams per tonne silver), 13.91 percent zinc and 5.06 percent lead. Kennecott is the majority owner and operator of the mine. The mine went into production in 1989, but due to low metal prices, it was shut down in 1993. Since then about 30 people were employed in delineating and exploring the newly discovered Southwest Extension orebody. During 1995 the workforce was gradually increased to more than 100, and Kennecott announced its intention to reopen the

mine in late 1996 or early 1997 because of the increased reserves and improved metal price forecasts.

The mine is expected to produce about 1,320 tons (1,197 tonnes) per day with a workforce of about 250, with annual production of about 62,000 ounces (1,928 kilograms) of gold, 11 million ounces (342,139 kilograms) of silver, 79 million pounds (35.8 million kilograms) of zinc and 40 million pounds (18.1 million kilograms) of lead.

The U.S. House of Representatives recently approved a land exchange with the U.S. Forest Service that allowed Kennecott to develop extralateral underground reserves in return for a royalty payment and ultimate transfer of patented claims to the government. Passage of this legislation is considered probable.

Abacus Minerals Corporation and Pamicon had a major exploration program at the Niblack massive sulfide deposit on Prince of Wales Island. The property was acquired from Noranda Exploration and Lac Minerals after a takeover by Barrick Gold. The property is a gold enriched, copper-zinc volcanogenic massive sulphide hosted in the Cambrian Wales Group. About 20,000 tons (18,140 tonnes) were mined out of five levels between 1903 and 1908. Cominco explored the area and drilled a few holes in the early 1970s, and Anaconda staked a large claim group in 1977. This was subsequently optioned to Noranda, and in turn to Lac Minerals.

Abacus has defined five target areas on the property and conducted geologic mapping, geochemical sampling, geophysical surveys, and dug several trenches near the old workings. A 10,000 foot (3,048 meter) diamond-drill project was completed in 1995. Work concentrated a near-surface zone of pyrite-rich crystal tuffs called the Gold Zone. Drilling cut an oxide zone from 28 to 88 feet (8.5 to 26.8 meters) below surface, followed by 104 feet (31.7 meters) of base metal-rich massive sulfides. The whole 164 foot (50 meter) intercept ran 0.11 ounces per ton (3.77 grams per tonne) gold, 1.31 ounces per ton (45 grams per

tonne) silver, 0.41 percent copper, and 1.09 percent zinc. Several other holes returned good gold values over significant widths. This new zone is similar to the Lookout Zone on the same property.

Based on the drill results and the possibility of finding additional mineralization, Abacus has announced a partnership with Teck Corporation, which allows Teck to earn a 51 percent interest by completing a positive feasibility study, and taking the property into production. The plans for 1996 include drilling another 20,000 feet (6,096 meters) to test areas of known mineralization and several geophysical anomalies.

Exploration and development of metal and industrial mineral deposits on Sealaska land on Prince of Wales Island continued through 1995. A deposit of chemical-grade limestone has been blocked out.

DRILLING

About 343,700 feet (104,760 meters) of diamond-drilling and 47,800 feet (14,570 meters) of reverse-circulation drilling can be documented in Alaska in 1995 (table 6). Some of this drilling, particularly at the A-J and Greens Creek Mines, was for development purposes and is included in the underground total of 166,182 feet (50,650 meters).

Although core-drilling in 1995 was about the same as in 1994, reverse-circulation drilling was only about half that reported in 1994.

Total drilling reported in 1995 was down only about 8 percent from that reported in 1994.

Table 6 shows the drilling footages reported in 1995 from the various regions of the state and the commodities sought.

Note that drilling for the stripping of coal and placer overburden is reported as a footnote, and is not included in the exploration and development total.

Table 6. *Drilling footage by region in Alaska, 1995*

Type of drilling	Northern	Western	Eastern interior	South-central	South-western	Alaska Peninsula	South-eastern	TOTAL
Placer exploration	10,000	3,570	12,130	50	1,500	--	--	27,250
Placer thawfield	--	--	--	--	--	--	--	--
Placer subtotal	10,000	3,570	12,130	50	1,500	--	--	27,250
Coal subtotal								
Hardrock core	56,398	30,050	33,110	10,000	17,000	--	197,116	343,674
Hardrock rotary	--	15,900	31,895	--	--	--	--	47,795
Hardrock subtotal	56,398	45,950	65,005	10,000	17,000	--	197,116	391,469
TOTAL (feet)	66,398	49,520	77,135	10,050	18,500	--	197,116	418,719
TOTAL (meters)	20,238	15,094	23,511	3,063	5,639	--	60,081	127,626

-- Not reported.

Note: 116,803 feet of core-drilling was underground

GOVERNMENT ACTIONS

Several pieces of legislation recommended by the Alaska Minerals Commission in its 1995 report were signed into law by Governor Knowles.

House Bill 128 allows the discharge of small amounts of drill fluids or solids onto state lands without an individual permit. This technical change to the Alaska Statute 46.03.100 answered a problem which had surfaced in 1994 when the State Department of Environmental Conservation at the request of environmental groups had selectively applied the requirement to the mining industry. Regulations pursuant to the statute were so broad as written that any discharges such as bilge-pumping or ditching would have required a special permit.

House Bill 197, the Exploration Incentives Bill, was signed into law by Governor Knowles in Fairbanks on June 20, 1995. When a mine begins operation the bill allows up to 100 percent of exploration expenditures, to a maximum of \$20 million, to be deducted from up to 50 percent of the annual royalties and mining license tax over a 15-year period. It also calls for all of the exploration information to be turned over to the state. Credits for exploration on a specific property remain with the property and can be transferred to a subsequent owner.

Senate Bill 16 transfers title to 350,000 acres (142,000 hectares) of state land to the University of Alaska as part of its land grant, but forbids the selection of lands already claimed by other parties.

At the request of the Fairbanks Industrial Development Corporation the legislature appropriated \$400,000 for aeromagnetic and electromagnetic surveys in the Rampart-Manley area west of Fairbanks during the summer of 1995. Flying was done in September 1995. The results were released March 4, 1996, but some staking of prospecting sites was noted during the summer of 1995.

The U.S. Bureau of Mines was dissolved in 1995 by the U.S. Congress. It had been active in Alaska mining for more than 80 years, with field offices in Juneau, Anchorage, and Fairbanks. The Bureau's Alaska work ranged from coal to strategic minerals to placer deposits. In recent years Bureau Mining District studies helped spur mineral exploration in

southeast and southcentral Alaska. Furthermore, projects undertaken by Bureau research centers assisted Alaska placer miners develop more efficient and environmentally safe mining methods and aided hardrock mines such as Greens Creek with secondary blasting problems. Although the Bureau of Mines was officially closed by executive order on January 19, 1996, its presence in Alaska will persist. All members of the Bureau staffs in Juneau and Anchorage were transferred to the U.S. Bureau of Land Management (BLM). Their BLM function will be specific to mineral assessment on federal lands. The Bureau's institutional memory and databases will remain in Alaska for the foreseeable future and therefore be readily available for consultation and use by the minerals industry.

DNR Commissioner John Shively and Geologist Kathy Charlie presented reclamation awards during the annual Alaska Miners Convention in Anchorage in November 1995. Seven miners received recognition of excellent reclamation on the properties that they mined. The recipients who were honored are Thomas Faa, Eva Creek, Bonnifield mining district; Mark Funk, Munson Creek, Fairbanks mining district; Edward Salter, Pioneer Creek, Hot Springs mining district; Thurman Oil and Mining, Rhode Island Creek, Hot Springs mining district; True North Joint Venture exploration trenches on Pedro Dome, Fairbanks mining district; Tim Kiehl, Gold King Creek, Bonnifield mining district; and Douglas Baker, Hope Creek, Circle mining district. Recipients of the 1995 Awards completed their reclamation and had it inspected and approved by the Division of Mining & Water Management (DMWM) or BLM within the last four mining seasons. Nominations for the awards were received from the State Division of Geological & Geophysical Surveys (DGGS), DMWM, and private citizens.

Four mining firms received the Governor's Award for Reclamation, in recognition of outstanding reclamation of the properties that they mined. The recipients of the 1995 Governors Award for Reclamation are Robert Keller, Totatlanika River, Bonnifield mining district; Sphinx America, Monument and Midnight Creeks, Ruby mining district; Cambior Alaska, Inc., Valdez Creek, Valdez Creek mining district; and Ronald Engstrom, Basin Creek, Nome mining district.

DEPARTMENT OF NATURAL RESOURCES
Division of Geological & Geophysical Surveys
Division of Mining & Water Management

DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT
Division of Trade and Development

