

ALASKA'S MINERAL INDUSTRY 1983

Alaska Office of Mineral Development
Alaska Division of Geological & Geophysical Surveys
SPECIAL REPORT #33



Front Cover—

**Anaconda's exploration drill at recently announced Johnson River
gold and base metal find on Cook Inlet Regional Corporation lands.**
photo by Bill Ellis

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and Geophysical Surveys

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By

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College, Alaska

1984

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FOREWORD

Special Report 33, 'Alaska's Mineral Industry—1983' is the third annual report produced jointly by the Department of Commerce and Economic Development, Office of Mineral Development, and the Department of Natural Resources, Division of Geological and Geophysical Surveys, detailing the activities of the mineral industry in Alaska during 1983. A prime objective is to provide both private sector and government agencies with reliable, current information concerning an industry which is expected to grow substantially in importance in the years ahead. The report is dependent on the cooperation of companies and individuals that supplied basic information.

The value of the mineral industry to the State's economy grew in 1983 to a gross worth of \$294.3 million—a rise of 4% over 1982. The gain was due to continued growth of demand for sand, gravel and stone. This more than offset substantial declines in exploration and mine development activity.

Asustained world wide economic recovery will directly benefit the mining industry in Alaska. Major Pacific Rim markets are increasingly seen as vitally important for Alaska's minerals, however, participation in that marketplace continues to be constrained by the lack of infrastructure necessary to access and transport high bulk products such as coal and base metal concentrates from mine site to ship. Overcoming this limitation will take time and commitment by both public and private sectors of the economy.

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Executive Summary

This report summarizes exploration, development, production, and drilling activities of the Alaskan mineral industry during 1983 (excluding oil and gas). Total value of 1983 production in Alaska was \$232.4 million, up nearly 18 percent from the 1982 level. The average 1983 national increase in mineral production was 10 percent. The sand-and-gravel and building-stone industries were responsible for the high overall values. About 169,000 oz of gold was produced from about 300 placer mines in 1983, about the same as the previous year. No lode-gold production was reported.

Although development expenditures decreased \$27.8 million—down some 33 percent from record 1982 investments—expenditures did exceed those of previous years. Exploration continued to drop from record levels set from 1979 to 1981. About \$34.1 million was spent in 1983, down 24 percent from the 1982 level and over 50 percent from the 1981 level. However, total 1983 'value' for exploration, development, and production was \$294.3 million, up nearly 4 percent from the 1982 value of \$283 million (fig. 1). Hence, the value of production offset the decreases in preproduction activities. Although most Alaskan minerals analysts predicted a poor 1983 performance, the mineral industry fared better than expected.

Some noteworthy 1983 news events pertaining to mining in Alaska include:

Governor Bill Sheffield recently signed a memorandum of intent to speed the permitting process. The Office of Management and Budget will initiate the development of regulations designed to streamline the permitting process. The agency plans to establish offices in Anchorage, Fairbanks, and Juneau to improve accessibility for those seeking development permits.

In March, the U.S. Department of Interior announced its intention to begin competitive leasing of offshore areas (>3 mi offshore) in the Arctic Ocean, Beaufort Sea, and Bristol Bay regions for mineral exploration. State land, which extends to 3 mi offshore, may be available for leasing by mid-summer.

From July 25-29, a 6,000-mi-long Canadian arctic mine tour was conducted by the Alaska Miners Association. The tour provided a first-hand look at the development of mining in an environment similar to Alaska's. Several Alaskan state officials, including Department of Natural Resources (DNR) Commissioner Esther C. Wunnicke, Department of Commerce and Economic Development Commissioner Richard A. Lyon, and Senators Jan Faiks and Arliss Sturgulowski participated.

Consternation continued among placer miners over water-quality standards administered by

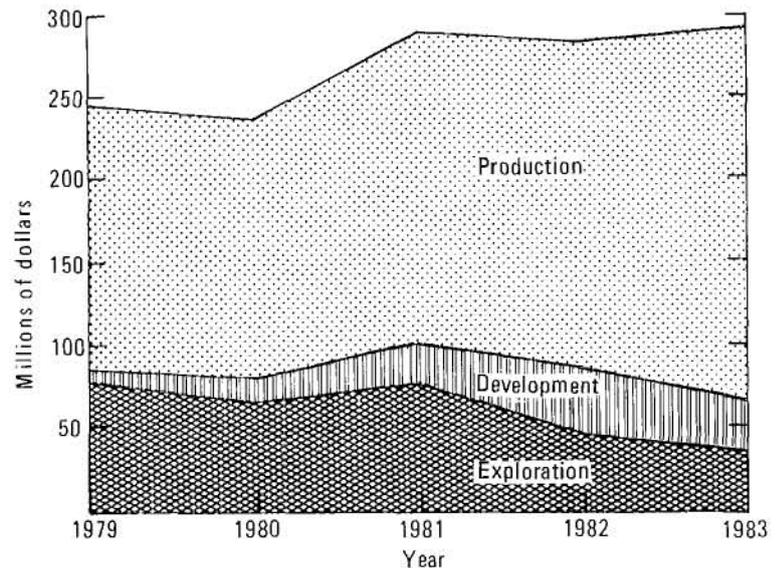


Figure 1. Value of mineral activity in Alaska, 1979-83.

the Alaska Department of Environmental Conservation (DEC) and the U.S. Environmental Protection Agency (EPA). Last spring, DEC created a Placer Mining Task Force that consists of miners, state and federal regulators, environmentalists, and legislators. Although progress was claimed in resolving the complex issues involving mining and water quality, a major gold-dredging operation in southwestern Alaska was forced to close over a water-quality issue. DNR records show that in 1983, settling ponds designed for water-quality enhancement were installed in increasing numbers by Alaska's placer miners—up nearly 250 percent from 1979. Two test cases have involved petitions to reclassify the Tolovana River and Nolan Creek to industrial use. In December, DEC denied the Tolovana River reclassification, but granted the Nolan Creek petition submitted by Silverado Mines. However, the Nolan Creek decision is still subject to EPA approval.

Progress is being made toward the Alaska Division of Geological and Geophysical Surveys' (DGGs) goal of creating a core-storage facility at its Eagle River compound. A core and sample library is of great value to both mineral and petroleum firms, and industry cooperation will be encouraged. Last summer, the U.S. Geological Survey (USGS) Western Regional Director agreed to provide \$150,000 for renovation of the storage facility.

An estimated 120 Alaskan miners lost about \$2 million as a result of the bankruptcy of Delta Smelting and Refining, Ltd., of Richmond, British Columbia, and its sister company, Delta Smelting and Refining of Alaska, Inc. Many miners stored bullion at Delta Smelting for 'startup' funds for the 1983 season. In response to the needs of qualified miners who lost money as a result of the failure, emergency

legislation was enacted to finance working capital for 1983 mining operations.

A state program was enacted in 1980 to provide loans to miners. The program is administered by the Department of Commerce and Economic Development Division of Business Investments. The state will loan up to \$5 million to a qualified borrower, depending upon collateral, at 10 percent interest for a maximum term of 15 yr. Through December 31, 1983, 49 loans that total \$25,962,743 have been approved.

Governor Bill Sheffield directed DNR Commissioner Esther C. Wunnicke to establish a Division of Mining within the DNR. The governor stated that this division will give specific attention to the state's administration of mining issues. The new division includes the DGGs Mining Information offices and part of the existing Division of Minerals and Energy Management. The new director is longtime Alaskan Pedro Denton.

The future of the Kantishna mining district and Dunkle township mineralized areas was examined and debated in 1983. When nearly 4 million acres surrounding the Mount McKinley National Park were designated Denali National Park-Preserve by the Alaska National Interest Lands Conservation Act (ANILCA) of 1980, both the Kantishna Hills and the Dunkle township were included, along with existing mining claims. Congress mandated a study to determine the resources of the areas and to resolve the conflicts with park values. The final report was due December 2, 1983. In May, DGGs released a mineral-resource-modeling effort of the Kantishna-Dunkle mine-study areas. The model predicted that nationally significant amounts of lode antimony and silver could be produced and that placer-gold production could continue into the year 2000. Copper, gold, and silver production were assessed in Dunkle township. The U.S. Bureau of Mines (USBM) contracted \$1.2 million for drilling and exploration of the two mineralized areas, and the National Park Service (NPS) compiled an environmental impact statement (EIS) that summarized seven alternative actions that range from claim condemnation to exclusion of the areas from Denali National Park-Preserve. The study group, which was headed by the DNR and the NPS, presented their recommendations to the Alaska Land Use Council in early December. For the Kantishna Hills, the study group recommended allowing continued mining activities on valid existing claims and mandated the NPS to open portions of the mineralized terrane to additional leasing and mineral development contingent on various environmental factors. The study group recommended a 'no action' status for claims in the Dunkle township. The Alaska Land Use Council will make its final recommendations to Congress later this spring. The Kantishna

mining district has been an important source of gold, silver, antimony, lead, and zinc since early in the century and continues to produce gold, silver, and antimony. The Dunkle township has produced coal and contains promising prospects for base and precious metals.

Principals in the Greens Creek Project requested a boundary adjustment in the Admiralty Island National Monument to facilitate and remove the time constraints on exploration for possible lateral extensions of the Greens Creek orebody. An EIS has been prepared, and the proposed adjustment has received the full support of the state.

Usibelli Coal Mines, Inc., continued to prepare to export coal to Korea under its 15-yr agreement with the Sun Eel Corporation. Many industry analysts are keenly interested in the outcome of these activities. Most believe that successful shipment of a mineral product to a Pacific Rim market will send positive signals to the investment community that will ultimately affect other mineral-development projects statewide.

One company that has been especially bullish toward the future of mining in Alaska and the western states is NERCO Minerals, a subsidiary of NERCO, Inc., which in turn is the resource-development arm of Pacific Power and Light (Portland, Oregon). During 1981, NERCO Minerals acquired Resource Associates of Alaska (RAA), a successful Fairbanks-based exploration firm that owns mineral prospects throughout the state and has exploration rights to approximately 5 million acres of Native-owned lands. NERCO owns several silver mines in the western states and is one of the largest producers of silver in the United States. NERCO Minerals is presently completing a new six-story corporate-headquarters building in Fairbanks. NERCO Minerals and RAA will move into the new building in the spring of 1984.

While it was a bad year for the mineral-exploration industry, total expenditures did not dip to the \$20-million low predicted by most mining-company personnel. Additionally, grass-roots exploration continued, and at least two important discoveries were made or announced in 1983—the Johnson River precious metal - base metal deposits southwest of Anchorage and the Coal Creek tin-copper deposit near Talkeetna; the latter is summarized by Thurow (1983). Some large companies indicated that their expenditures will increase in 1984.

The metals and mineral-commodities markets continue to be sluggish and unresponsive despite a nationwide economic recovery. This reflects large inventories built up over previous years and during the 1981-82 recession. However, bright spots on the horizon include gold, silver, platinum, zinc, and high-technology metals. The effect of environmental

problems on the domestic asbestos market has negatively affected short-term prospects for the Alaska Asbestos project in the Yukon-Tanana Up-land.

Some recent state publications that pertain to mining and mineral development in Alaska include:

'Placer mining...its role in the Alaskan economy,' published by the Department of Commerce and Economic Development Office of Mineral Development (OMD). The study, which was conducted by Louis Berger and Associates, showed that 2,552 persons were directly employed in placer mining in 1982 and that direct expenditures were \$80.1 to \$83.1 million. The total statewide economic impact was estimated at \$235 to \$244 million.

'Permit guidelines for the mineral industry in Alaska,' by J.P. Fernette, was also published by OMD. This document is a useful working handbook and reference guide for industry personnel and for those in the public and private sectors. It is being updated and will be available in late 1984.

'Alaska's coal provinces and resources,' by State Geologist R.G. Schaff and DGGs coal geologist R.D. Merritt, provides an overview of Alaskan coals, which may account for up to 48 percent of the United States coal base. This paper was presented at the Alaska Resource Development Council's International Conference on Coal, Minerals, and Petroleum in Anchorage in February 1983.

The Division of Minerals and Energy Management (DMEM) published summaries of mining rights, regulations, and statutes. Proposed offshore and onshore mining-lease regulations are in review.

'Matanuska-Susitna Borough, summary of mineral resources,' was authored by Daniel E. Renshaw under contract to DGGs and was published by the borough.

'Mineral terranes of Alaska,' first published in 1979 by the University of Alaska Arctic Environmental Information and Data Center (AEIDC) at a scale of 1:1,000,000, shows ore and host-rock type and the relative size of deposits. A new edition, 'Mineral terranes of Alaska 1982,' was prepared by



Figure 2. Regions of mineral activity in Alaska. Modified from Eakins and Daniels, 1980.

C.C. Hawley and Associates and is now available from AEIDC.

'Placer mining in Alaska,' by D.J. Cook, is available from the University of Alaska Mineral Industry Research Laboratory (Fairbanks).

The balance of this report examines levels of exploration, development, and production in seven major regions of the state (fig. 2) as originally defined by Eakins and Daniels (1980). Principal commodity groupings include base and precious metals, industrial and structural materials, coal, and peat. Appendix A lists selected new 1983 claim blocks, and appendix B summarizes the addresses and functions of important state and federal agencies, local municipalities, and private-interest groups involved in Alaskan mineral development. Selected significant mineral deposits in the state are summarized in appendix C. Appendix D lists mining licenses issued by the Alaska Department of Revenue in 1983, and appendix E lists selected sand, gravel, and quarry-stone operators in the state.

Acknowledgments

This report is jointly produced and distributed by the Department of Natural Resources Division of Geological and Geophysical Surveys and the Department of Commerce and Economic Development Office of Mineral Development. The success of this and previous reports is largely dependent on information voluntarily provided by the private sector. We thank Alaska's miners, industry explorationists,

consultants, and Native corporations for their generally excellent cooperation. We acknowledge T.L. Pittman, Bob Hoekzema, and John Mulligan (USBM) for providing selected statistics for some industrial-minerals and gold production in south-central Alaska. P.R. Holdsworth provided activity information for southeastern Alaska. J.G. Clough and D.A. Coleman (DGGs) provided a listing of new claim blocks. L.L. Lueck (DGGs) researched the addresses for sand-and-gravel and building-stone operators and compiled

information for appendix B. G.R. Eakins and T.K. Bundtzen (DGGs) wrote the executive summary and Eakins wrote the exploration section. Bundtzen wrote the development and production sections and compiled the statistics used in the exploration, development, and production sections. M.S. Robinson (DGGs) and Bundtzen compiled a list of selected

significant mineral deposits (app. C). D.A. Coleman insured that DGGs questionnaires were mailed out and summarized the results of the returned documents. Charles Green (OMD) designed the report format and wrote the section on drilling. Eakins, Bundtzen, C.L. Daniels (DGGs), Green, and J.F.M. Sims (OMD) edited the report.

Exploration Activity in 1983

Introduction

Reported exploration expenditures for 1983 indicate a further decline from previous years. The recessionary economy is probably the main reason for the decreased level of activity in 1983. Interest in precious metals, tin, and tungsten remained high, but low metal prices, a generally sluggish economy, and the lack of transportation facilities decreased exploration funding for other metals, coal, and uranium. However, the potential for new discoveries and large-scale mineral production in Alaska has not lessened, and companies are continuing to do assessment work and explore the large number of claims acquired during the past few years. While the response to the DGGs survey of mining activities is not complete, total reported expenditures include those of most major companies.

Total reported 1983 expenditures for exploration were \$34.1 million, down 24 percent from 1982 and 56 percent from 1981 (table 1; fig. 3). Exploration

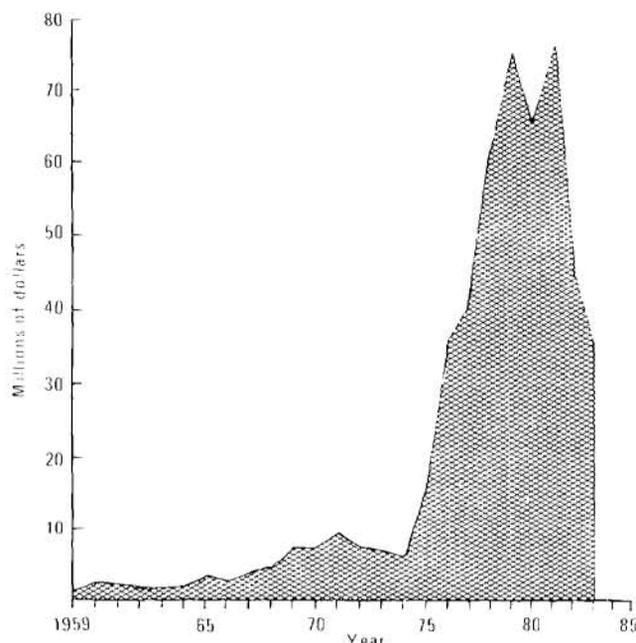


Figure 3. Mineral exploration expenditures in Alaska, 1959-83.

Table 1. Exploration expenditures by commodity grouping, 1980-83.*

	1980	1981	1982	1983
Base metals	\$ 6,775,000	\$28,262,200	\$31,757,900	\$ 9,758,760
Precious metals	5,086,500	35,273,200	10,944,100	20,897,555
Industrial and structural materials	1,250,000	10,300,000	NR	2,068,300
Coal and peat	125,000	2,341,000	2,900,000	1,338,454
Miscellaneous**	NR	127,000	15,300	10,000
Unspecified	52,000,000	NR	NR	60,000
TOTAL	\$65,236,500	\$76,303,400	\$45,617,300	\$34,133,069

* 1980 data from reconnaissance survey

** Uranium, gemstones, etc.

NR = not reported

expenditures are reported in both region and commodity groupings (table 2). Other indicators of mineral-exploration activities are the number of claims on which assessment work was performed and the number of new claims staked, both of which sharply declined in 1983 (figs. 4 and 5). A total of 81,335 man-days of employment were reported for exploration activities in 1983.

A surge in prospecting and development of offshore minerals in Alaska has occurred during the past 2 yr. DNR is reactivating the state's offshore program and will issue permits to explore for locatable minerals on tidelands and submerged lands. A permit is issued for 7 yr, and if the permittee shows he has a workable deposit, the permit can be converted to a noncompetitive offshore mining lease that

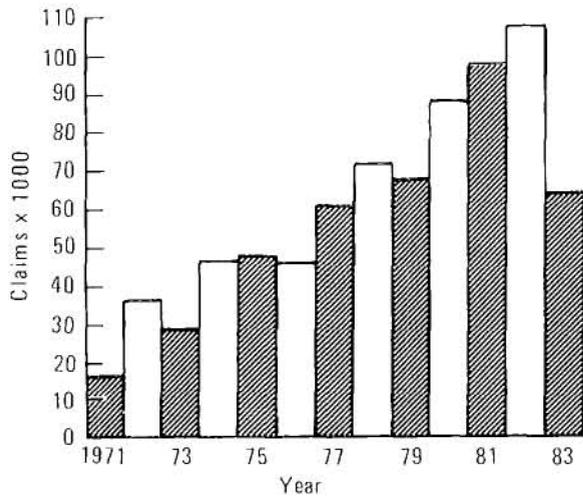


Figure 4. Assessment work filed in Alaska, 1971-83.

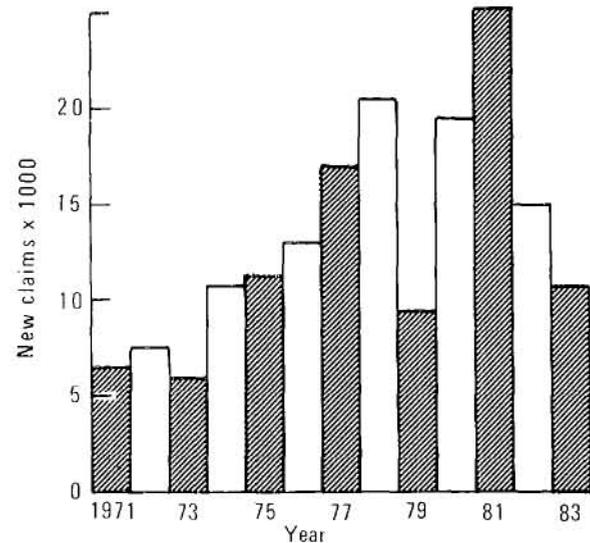


Figure 5. New claims filed in Alaska, 1971-83.

Table 2. Reported exploration expenditures and employment in Alaska by region and commodity, 1983.

Commodity	Region							
	Northern	Western	Eastern Interior	South-western	South-central	South-eastern	Alaska Peninsula	No region specified
Base metals	\$1,515,260	\$1,397,000	\$2,270,000	\$ 604,500	\$2,000,000	\$ 507,000	\$ 465,000	\$1,000,000
Precious metals								
Placer	153,400	743,510	2,751,575	485,500	539,570	32,000	NR	NR
Lode	250,000	1,500,000	3,104,000	225,000	1,832,000	1,414,000	7,267,000	500,000
Coal and peat	600,000	NR	38,454	NR	700,000	NR	NR	NR
Other	NR	130,000	1,002,300	NR	6,000	NR	NR	1,000,000
TOTAL	\$2,518,660	\$3,770,510	\$9,166,329*	\$1,315,000	\$5,077,570	\$1,953,000	\$7,732,000	\$2,500,000
Employment (man-days)	9,902	10,612	24,513	4,828	13,167	5,661	7,952	4,700

* Includes \$1.2 million exploration effort for Kantishna-Dunkle study by Salisbury & Dietz, Inc., under contract to U.S. Bureau of Mines.
 NR = not reported
 e = estimated

is good for up to 10 yr. Public hearings are held to evaluate environmental effects. Due to an environmental lawsuit, offshore prospecting permits have not been issued since 1975, and about 850 applications are backlogged. However, present exploration and development are underway off the coast of the Seward Peninsula, in Cook Inlet, in the Gulf of Alaska off Icy Bay and Yakutat Bay, in Delarof Harbor at Unga Island, offshore from Baranof Island, and in Gastineau Channel near Juneau (fig. 6). DNR currently administers 70 active permits and nine offshore mining leases. Interest in offshore mineral potential is also being shown by the federal government which, through the Minerals Management Service, is initiating a program to identify United

States nonenergy minerals offshore, including Alaska. Individual states are expected to participate in the program, and DGGs may become involved.

The USBM and USGS jointly assessed the mineral resources of the Chugach National Forest under the RARE II program. The area has produced 264,000 oz of gold and 206 million lb of copper. These agencies rated the potential for gold, copper, coal, oil, building stone, and sand and gravel, and identified the presence of antimony, arsenic, cobalt, manganese, molybdenum, nickel, and chromium. The potential for production of these resources is in part dependent upon the final management plan developed for the Chugach National Forest.

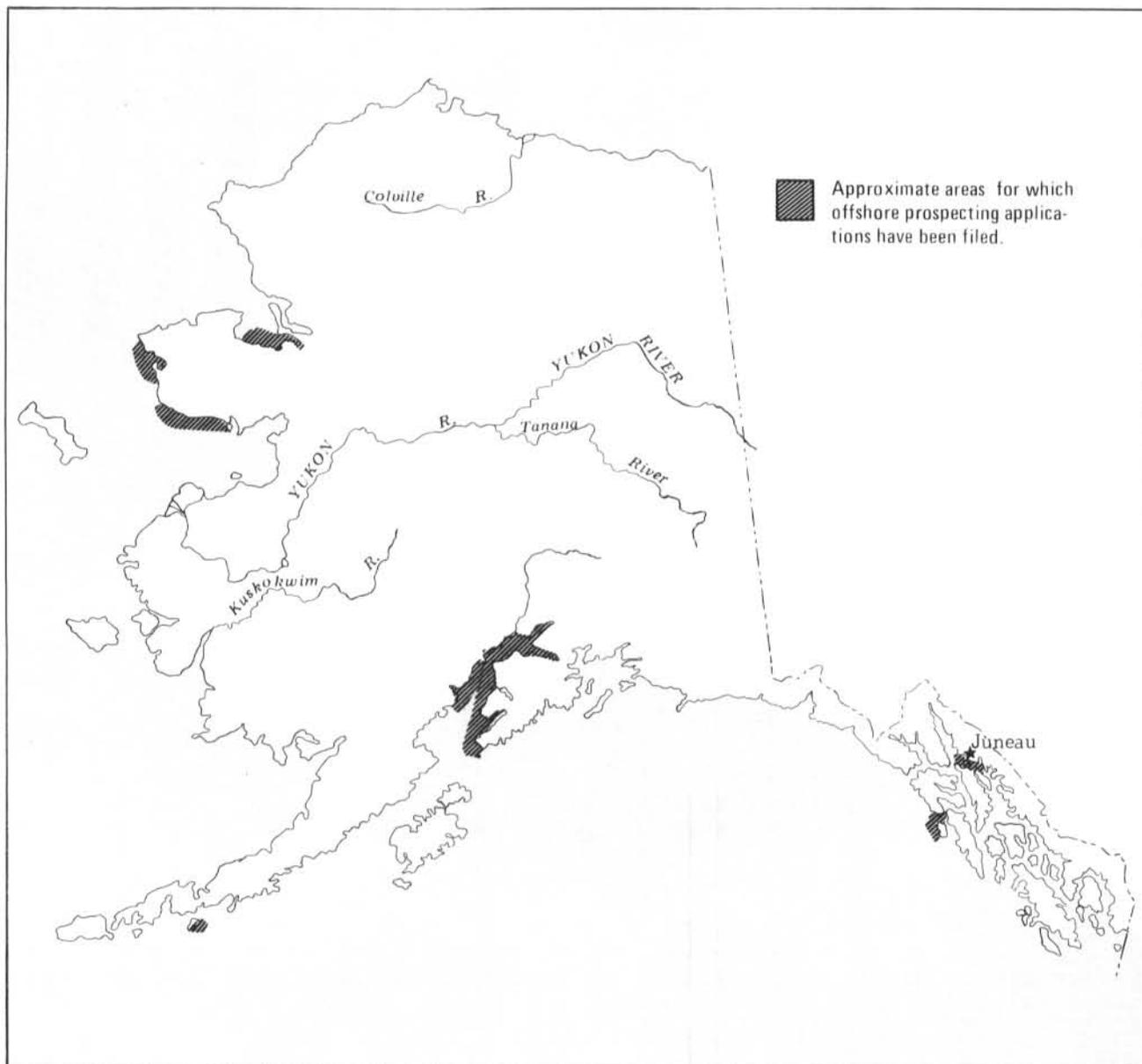


Figure 6. Approximate areas of offshore prospecting applications from Department of Natural Resources Division of Minerals and Energy Management, 1983.

Exploration activities compiled in this report are grouped by major commodity and region (fig. 1). Selected mineral-exploration activities are shown on figure 7. The listing by commodity is sometimes arbitrary because explorationists are usually prospecting for several groups of metals at the same time, and many of the prospects are polymetallic.

Copper, Lead, and Zinc

Northern Region

The northern region includes the Ambler district on the south flank of the Brooks Range, where \$12 billion (in-place) worth of copper, lead, zinc, silver,

gold, and cobalt has been located in several major deposits within the 100-mi-long 'schist belt.' Due to depressed metal prices and the lack of infrastructure, development is on hold, and most exploration conducted during 1983 was limited to assessment work and testing of claim blocks previously acquired by major mining companies. However, development and exploration in the De Long Mountains in the western Brooks Range are continuing.

The Wulik basin in the De Long Mountains is the site of extensive study and exploration centered around the Red Dog, Lik, and SU deposits. According to Cominco Alaska, Inc., (Cominco) in partnership with NANA Regional Corporation, the Red Dog deposit is in the development stage. This major

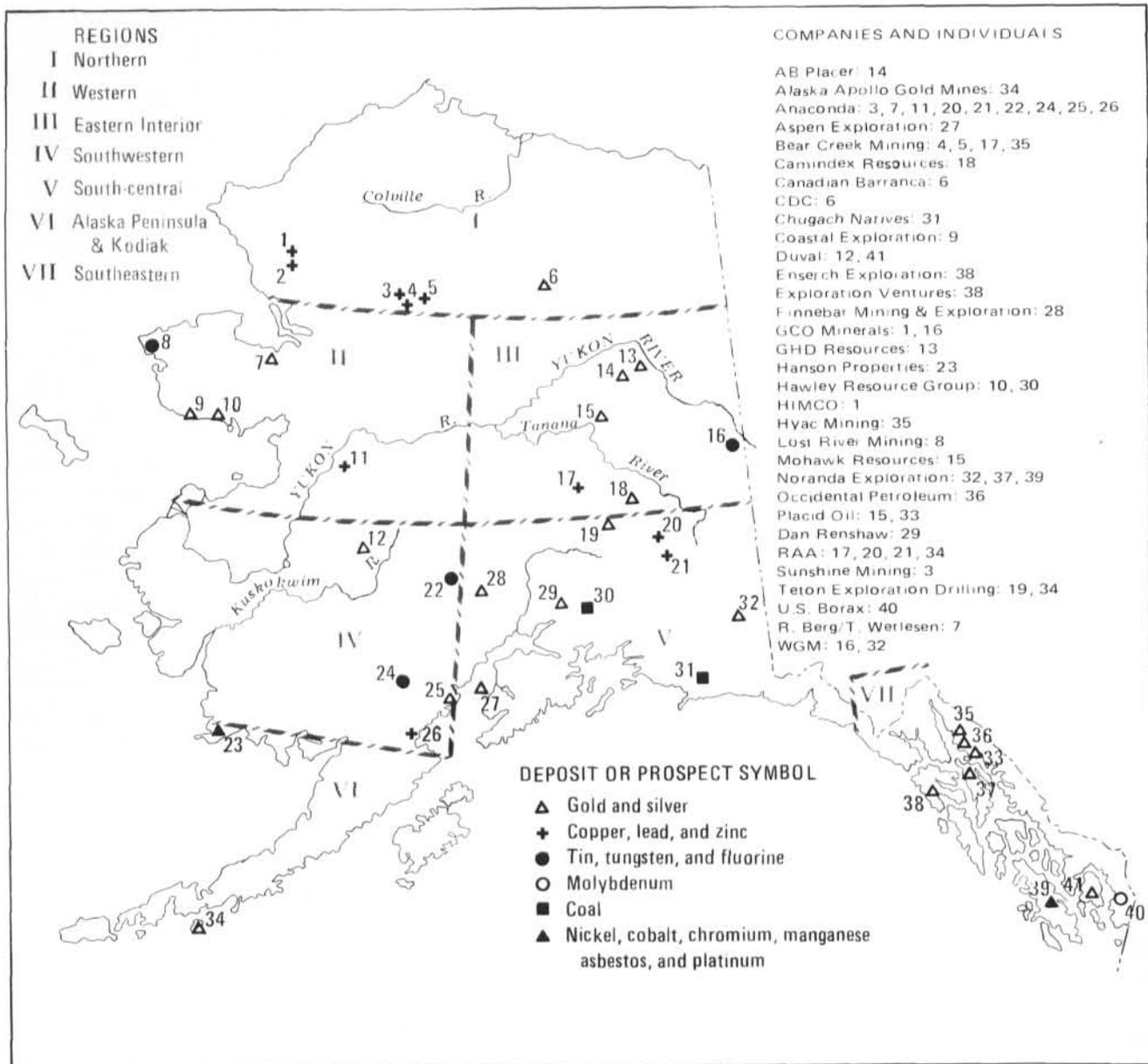


Figure 7. Selected mineral-exploration projects in Alaska, 1983. Numbers refer to locations in appendix C.

undertaking is discussed in the development section. Additional drilling last season did not significantly change previously announced reserve estimates for the 'Main' deposit. Cominco also continued work on the SU deposit a few miles west of Red Dog, and their assessment work in the Ambler district included drilling, geological, geochemical, and geophysical surveys. General Crude Oil Minerals Company (GCO) and Houston International Minerals Corporation (HIMCO) drilled the Lik lead-zinc-silver deposit in the De Long Mountains adjacent to the SU deposit. The announced reserves of the Lik deposit are 25 million tons grading 12 percent combined lead and zinc, and 1.3 oz of silver per ton. Anaconda Minerals Company (Anaconda) and its partner, Sunshine Mining Company, operated in the Brooks Range as the Ambler Mining Company in 1983. They control several important deposits, including Sun, Smucker, and Picnic Creek. During 1983, the partnership conducted a relatively modest exploration program that consisted of additional drilling, mapping, and geochemical and geophysical surveys. The two companies each also own separate claim blocks. Noranda Exploration, Inc., (Noranda) also remained active in the Ambler district.

Bear Creek Mining Company, a subsidiary of Kennicott Copper Corporation, conducted reconnaissance exploration in the Noatak district, assessment work on their Arctic deposit in the Ambler district, and drilling on their Bornite (Ruby Creek) deposit in the Cosmos Hills. Announced reserves for the Arctic deposit are 40 million tons grading 4 percent copper, 5.5 percent zinc, 1 percent lead, 1.5 oz silver, and 0.02 oz gold/ton. The Bornite deposit contains up to 40 million tons of about 2 percent copper plus zinc and credits of cobalt and silver. Included in these figures are about 5 million tons of ore grading 4 to 12 percent copper.

Western Region

Greatland Exploration of Anchorage has obtained the Omalik lead-zinc-silver property near the old Omalik lead-silver mine (western Darby Mountains) where high-grade ore was once produced. Anaconda staked claims, drilled, mapped, and did assessment work at Illinois Creek, about 40 mi southwest of Galena. They also explored for base metals in the Medfra and Ophir Quadrangles. Patino, Inc., one of the Northgate Group of Companies of Toronto, Canada, explored for base metals in the western region.

Eastern Interior Region

The eastern interior region includes the central and eastern portions of the Alaska Range and the

Yukon-Tanana Upland. The Yukon-Tanana Upland contains several recognized placer and lode mineral belts. The discovery of a number of stratiform massive-sulfide deposits in the Alaska Range is very significant, and their full potential is still undefined.



Figure 8. Salisbury and Dietz, Inc., diamond drill rig on Little Annie silver-lead-zinc properties, Quigley Ridge, Kantishna district, Alaska. Photograph by T.K. Bundtzen, 1983.

Salisbury and Dietz, Inc., (Spokane, Washington) was awarded a \$1.2 million contract to explore mineralized lands in Denali National Park-Preserve. The project was mandated by the ANILCA of December 1980, which instructed the Alaska Land Use Council to conduct resource studies of the Kantishna Hills and Dunkle township areas and report to Congress 3 yr after enactment of the ANILCA. As a participant in this study, DGGs released Report of Investigations 83-12, 'Mineral resource modeling, Kantishna-Dunkle mine-study areas, Alaska' (Bundtzen, 1983), which presented a method for estimating the mineral endowment in the mineralized regions. Silver, antimony, gold, various metals, and coal are the principal commodities under investigation. Approximately 5,000 ft of diamond core drilling, 2,000 ft of churn drilling, and bulk sampling of both lode and placer deposits were completed (fig. 8). In addition, an economic evaluation of patented and unpatented claims was conducted by DOWL Engineers of Anchorage, and according to study results, the cost of claim acquisition by the federal government would be \$157 million, in the event of adjudication.

South-central Region

Cooper Industries and its parent firm, Geneva Pacific Corporation, have actively explored the McCarthy district in the Wrangell Mountains for

several years, notably at the Binocular prospect. Recently, the firm donated 500 claims in the Wrangell-St. Elias National Park-Preserve to the federal government for incorporation into the park. The president of Cooper Industries said that although the 10,000 donated acres are mineral-rich and the firm has spent about \$1 million on the claims, Cooper Industries decided they were not economic to develop. The company declined to take a tax writeoff. Other properties were sold to AHTNA, Inc., of Copper Center. Geneva Pacific Corporation is not presently exploring or developing claims in Alaska.

Bear Creek Mining Company examined a massive-sulfide deposit (with associated tin) near Sheep Creek about 13 mi east of Healy. Watts, Griffith, and McQuatt, Inc., (WGM) in a joint venture with Phillips Petroleum Company, did assessment work on claims that contain base and precious metals in the interior region. Several strata-bound deposits located by RAA and Getty Minerals during 1976 in the Alaska Range are still under active exploration. Deposits at Anderson Mountain, Virginia Creek, Dry Creek, Sheep Creek, and Liberty Bell include precious and base metals. HOMEX, operator for a group that includes Buzby Mines, Getty Minerals, and Phelps-Dodge Corporation, is exploring for base and precious metals in the Bonniel district. Geoprize, Ltd. (Fairbanks) and Hawley Resources Group performed assessment work and evaluations in the Dunkle mining area on the upper Chulitna River. The area is also under study by a joint federal-state team as part of the mandate to assess mineral potential under the ANILCA legislation.

RAA, discoverer of the 'Delta' mineral belt in the old Tok mining district in the eastern Alaska Range, conducted assessment work on a large claim block and did additional mapping and geochemical surveys in the 400 mi² mineralized area. However, Anaconda dropped their option with RAA in late 1982. The district contains at least 35 base-metal massive-sulfide deposits in a thick sequence of Devonian metavolcanic and metasedimentary rocks.

Doyon, Ltd., a Fairbanks-based Native corporation, in partnership with Patino, Inc., conducted geochemical and geophysical surveys and geologic mapping in their search for base metals on extensive Doyon land holdings in the interior. Northern Lights Exploration Company (Anchorage) did assessment work on a large number of claims in the central Alaska Range and prospected for base and precious metals using geochemical and geophysical methods.

Anaconda has an agreement with the Cook Inlet Region, Inc., (CIRI) to explore CIRI's lands in south-central Alaska. Under the agreement, Anaconda had a sizeable crew on the Johnson River prospect located a few miles south of Tuxedni Bay on the west side of Cook Inlet. Drilling and geochemical and

geophysical surveys were conducted to evaluate the deposit for base and precious metals. CIRI stated that exploration will continue for 2 yr before a decision is made on whether or not to develop the property. Anaconda also continued a widespread exploration program for base and precious metals in the Iliamna, Lake Clark, and Sleetmute Quadrangles. The program included drilling, geochemical and geophysical surveys, new claim staking, and assessment of old claims.

Hawley Resource Group did assessment work and exploration on the Paint River claims in the Iliamna Quadrangle. Hunt Oil Company Minerals Division (Hunt) performed assessment work on several claim groups and staked additional claims in the southern Alaska Range. They are prospecting for base and precious metals. Hunt also prospected several claim groups in the Big River drainage south of McGrath. The area has attracted interest in base and precious metals, molybdenum, tin, gold, and tungsten.

Southeastern Region

Hawley Resources Group did assessment work on the Haines Barite and Mt. Henry Clay claims about 33 mi northwest of Haines. The deposits contain base metals and barite. HIMCO, Anaconda, and AMAX each prospected in southeastern Alaska. Noranda explored the southern part of Prince of Wales Island for base and precious metals, continued exploration and drilling near Niblack Anchorage west of Moira Sound, and investigated prospects near the south end of Dall Island. Cominco and Anaconda are also interested in the Niblack area, which yielded about 1.4 million lb of copper, 1,000 oz of gold, and 15,000 oz of silver from the Niblack Mine prior to 1910. Duval Corporation (Duval) was active in the Ketchikan area and staked antimony-gold claims. WGM, in a joint venture with Phillips Petroleum Company, did assessment work on claims in the Port Alexander Quadrangle. Exxon Minerals Company used various exploration methods on sizeable claim blocks at Twelve Mile Arm and other sites on Prince of Wales Island.

Work on a major copper-cobalt deposit has continued for some years in British Columbia just north of Haines, Alaska. This has stimulated exploration for similar deposits within Alaska's border. The Canadian prospect is the Windy Craggy property held by Geddes Resources. Geddes' president told the Northern Miner that drilling indicated over 91 million tons grading 3.04 percent copper and 0.09 percent cobalt and that indicated overall tonnage is over 334 million tons with a grade of 1.52 percent copper and 0.08 percent cobalt. Additionally, and possibly of major significance, high gold values have been found in the footwall of the main sulfide orebody.

The deposit is only 40 mi from the Haines-Alaska Highway and 70 mi from tidewater.

Tin and Tungsten

Western Region

Anaconda continued drilling, trenching, and geologic studies of a major tin deposit at Kougarok Mountain, 80 mi north of Nome on the Seward Peninsula. The host rock is a hydrothermally altered granitic rock. Anaconda has applied for a permit to construct a 6,000-ft-long airstrip on Budd Creek and a connecting 10-mi-long access road to serve the prospect area. During 1983, the company also diamond drilled, mapped, and conducted geochemical surveys and assessment work on a large number of claims elsewhere in western Alaska. They had a 20-person crew in the field.

The Lost River tin-tungsten-fluorite deposits near Lost River on the western tip of the Seward Peninsula have been extensively drilled in the past, and large reserves are defined at several deposits. Lost River Alaska Corporation did some trenching, sampling, and mapping on the property during 1983, but plans for a townsite and a large mining operation have never materialized due to financial problems, complexities of ore treatment, and lack of a market and transportation.

Duval explored for tin and tungsten in the Medfra Quadrangle using air- and ground-magnetometer surveys. RAA has several gold-tin projects in the Ruby district, but no details are available.

Interior Region

Tin and tungsten prospects in the Salcha and Chena River basins east of Fairbanks are being explored by RAA, Union Carbide Corporation, Bear Creek Mining Company, and HIMCO.

Southwestern Region

Exploration interest in southwest Alaska has centered on base-metal and silver-tungsten epigenetic and skarn deposits. One of the most active companies in the southwest has been Anaconda, which last year continued grass-roots exploration and drilling at their Farewell silver-tungsten project in the southern Alaska Range. The Flat district, a producing placer-gold district, is also the site of the Golden Horn gold-tungsten shear zone that has recently been extensively drilled. Cominco conducted reconnaissance work for tin, tungsten, and other metals in the southwestern region.

South-central Region

Exploration by HIMCO at Coal Creek 5 mi west of the Parks Highway near Hurricane Station resulted in the discovery of a tin-bearing sheeted 'greisen' vein system. The veins contain cassiterite, sphalerite, arsenopyrite, and subordinate pyrite, chalcopyrite, and pyrrhotite. According to Thurow (1983), drilling indicates a 5-million-ton deposit grading better than 0.2 percent tin. Most veins lie within an early Tertiary granite that intrudes older granite and metasedimentary rocks.

Nickel, Cobalt, Chromium, and Platinum-group Metals (PGM)

Southwestern Region

Hanson Properties, Inc., (Spokane, Washington), which operates the Goodnews Bay platinum dredge, has encountered difficulties in reactivating the dredge. During the 1983 season, most of the company's efforts were directed toward exploring their placer gravel by digging test pits with a backhoe.

Southeastern Region

Galactic Resources, Ltd., and Cornucopia Resources, Ltd., have acquired the nickel-copper-cobalt deposits at Bohemia Basin on Yakobi Island from the Aleco Mining Group. The new operators announced that their 1983 drilling, sampling, and mapping program was conducted to determine if economic concentrations of PGM are associated with the sulfide deposits. A 1982 report by the Aleco Mining Group estimated that proven reserves of 15.1 million tons grading 0.37 percent nickel, 0.22 percent copper, and 0.02 percent cobalt at the Bohemia Basin and nearby Takanis deposits on Yakobi Island are recoverable by surface mining with a 2.5 to 1 stripping ratio. Two nearby prospects at Mirror Harbor and Flapjack are estimated to contain 5 million tons of nickel-copper-cobalt mineralization.

Orbex Minerals continued a limited exploration program at the Salt Chuck copper-palladium mine on southern Prince of Wales Island. Between 1900 and 1941, about 5 million lb of copper, 19,000 oz of palladium, and 2,500 oz of platinum (with silver and gold credits) were extracted from about 325,000 tons of ore. The copper and platinum metals are confined to the contact between pyroxenite and gabbro in an Alaskan type of zoned basic-ultrabasic complex.

Gold and Silver

Northern Region

Canadian Barranca Corporation, Ltd., explored extensive placer-gold properties owned by the Little Squaw Gold Mining Company in the Chandalar district about 200 mi north of Fairbanks. Placid Oil Company (Placid) was also active in the Chandalar district. Several small operators did assessment work and dug test pits on claims in the Wiseman district. Bill Fickus conducted limited geomagnetic surveys of placer deposits at Crevice Creek. Midnight Mining Association prospected and staked claims in the Prospect Creek area in the northeastern part of the Bettles Quadrangle. Their work included geochemical sampling, mapping, and trenching in their search for base and precious metals.

Western Region

World Evangelism, Inc., (San Francisco) holder of several claim blocks in the southeastern Bendeleben Quadrangle, did additional staking and geophysical and geochemical surveys for both base and precious metals during 1983. Rhinehart Berg and partners tested placer ground with a churn drill in the Candle Creek area, northeastern Seward Peninsula. Omega Energy Corporation (Lancaster, Ohio) conducted modest geochemical and geophysical surveys on the eastern Seward Peninsula, and George Massie and Hugo Lindfors (Iron Creek Company) each conducted a small prospecting program near Nome. During 1983, Noranda drilled to evaluate deep, meandering bench placers on Mud Creek in the Fairhaven district 3½ mi west of Candle. A company geologist said the gold may be in old strand lines and ancient sand bars. Using a Hawker Sidley Super-drill, the company hopes to identify a multimillion-yard reserve. Greatland Exploration (Anchorage) assessed a large number of claims on the Seward Peninsula, primarily for gold. Coastal Exploration looked at the precious-metal potential in Norton Sound and sought state and federal permits for offshore mining.

The potential for offshore gold placers led to development work off Bluff (east of Nome) by Phoenix Marine Exploration, Inc., (Phoenix) of Anchorage. Phoenix requested permits to dredge about 10 million yd of marine sediments. In September, the dredge, which was being towed by a tug, was grounded and swamped in high seas near Bluff, about 50 mi east of Nome. The dredge was refloated and secured for the winter.

Drilling by the Hawley Resource Group at the old Big Hurrah Gold Mine on the south coast of the Seward Peninsula has been underway for the past two seasons. The principal developer is Cornwall Pacific of Vancouver. The ore contains primarily gold, but tungsten values are also reported. Exploration suggests a potential for an open-pit operation and later underground mining.

Eastern Interior Region

New Dynasty, Inc., evaluated placer and lode ground on the Lucky claims (Livengood district north of Fairbanks) using a resonant drill to obtain 6-in.-diam cores from the frozen ground. Noranda re-entered the old Nabesna Gold Mine in the northern Wrangell Mountains. They built a 2-mi-long road, restored portals, and performed bulk sampling, about 1,200 ft of surface drilling, and underground work that included thawing some ice-filled adits. The property, which is now owned by Kirk Stanley, produced approximately 67,000 oz of gold from about 88,000 tons of ore from 1930 to 1941. This classic gold skarn is located at a contact between a quartz diorite intrusive and limestone. HIMCO had a crew searching for precious metals in the Alaska Range during the 1983 season. Jenson Mining and Construction (Delta Junction) did drilling, bulk sampling, and a magnetometer survey to assess claims in the eastern Alaska Range.

As in past years, gold-exploration continued at high levels in the Fairbanks district (fig. 9). Placid continued to aggressively explore a large claim block



Figure 9. Rotary drilling at the Soo Mine, Fairbanks district. Photograph by M.S. Robinson, 1982.

in the Cleary area 20 mi north of Fairbanks. Both vein systems and placer deposits are being tested, primarily for precious metals. A 24-person crew conducted surface and underground drilling, aerial surveys, geochemical sampling, trenching, and underground-development activities. Also in the Cleary district, Mohawk Resources Alaska and Alaska Mineral Services each conducted exploration and worked on their mills for processing local ores.

Silverado Mines conducted a limited program at the Grant Mine on Ester Dome and expects to increase their level of activity on this property in 1984.

Teton Exploration Drilling (Teton), in a joint venture with RAA, drilled the Zackley property on the south flank of the Alaska Range in the Mt. Hayes Quadrangle. The gold-silver-copper deposit is in a skarn zone that reportedly extends for 1 mi along the granite-limestone contact.

Denali Mining Company leased their Valdez Creek placer property on the south flank of the central Alaska Range to a joint venture that includes Camindex Mines (Camindex), Barrick Resources, TALCORP, and Sullivan Mines, Ltd. Their work is summarized in the development section. Camindex expects to start a mining operation in 1984. Aspen Exploration Corporation (Aspen) of Denver, drilled in the Valdez Creek area and is trying to initiate a placer operation. Gold Mining Company of Fairbanks performed drilling, magnetometer surveys, and trenching on a large number of claims in the Chena and Salcha River areas using Sedcore Drilling, Inc., equipment.

South-central Region

WGM assessed the Cliff Gold Mine in the Valdez Quadrangle using geologic mapping and geochemical and geophysical surveys. North Coast Mining Company conducted bulk-sampling operations in the Lawrence Creek placer area near Icy Cape (Cordova Quadrangle) with sample pits up to 20 ft deep. Hawley Resource Group and Greatland Exploration performed assessment work on lode-gold claims in the Talkeetna Mountains.

Aspen is seeking a permit from the U.S. Army Corps of Engineers to sample gravel and mineral deposits at 31 sites along the shore of Cook Inlet from Kalgin Island to Knik Arm and along the coast of the Kenai Peninsula. This is one of the first major offshore mineral-land disposals allowed by the state under new permit procedures. Aspen had applied for permits on one million acres of offshore state land in Cook Inlet, but the state limited the permit area to 100,000 acres. In reality, the company expects to lease a much smaller area once the most promising deposits are located. Sample drilling for gravel, gold,

and other heavy metals will be conducted from a boat or barge near shore. The company is considering using airborne geophysical survey methods developed by the Canadian Geological Survey for marine exploration. Onshore drilling and test-pit excavations are also contemplated.

Southeastern Region

Plans to undertake prospecting and evaluation at the old Alaska-Juneau and Treadwell gold-lode mines at Juneau were announced in October 1983. A proposal was submitted to the Juneau City-Borough Assembly and the Alaska Electric Light and Power Company, present owners of the properties, by Barrick Resources Corporation of Toronto through its subsidiary, Barrick Petroleum Alaska Corporation (BPC). BPC, reportedly with foreign investors, is seeking to obtain a long-range lease on the extensive low-grade gold properties. The Juneau City-Borough Assembly is studying the proposal. The famous mines produced about 6.5 million oz of gold before the last closure in 1944.

Queenstake Resources, Ltd., and Exvenco, Inc., obtained an option for a 50-percent interest in the Chichagof Mine located on the west side of Chichagof Island. The option commits Queenstake to explore and rehabilitate the property, and they also plan to treat old mill tailings. Prior to 1942, the mine produced 647,708 troy oz of gold from 596,478 tons of ore. Enserch Corporation, Inc. continued exploration and work on reentry of the Hirst-Chichagof Mine 2 mi north of Chichagof. Between 1905 and 1943, 131,000 troy oz of gold and 33,000 oz of silver were produced. Enserch Corporation, Inc. is also evaluating old tailings.

Hyak Mining Company announced reserves of 90,000 metric tons grading 0.28 oz of gold/metric ton at their Jualin Mine in the Berners Bay Mines group, and additional resources of 11 million tons grading 0.11 oz of gold/metric ton are reported. Bear Creek Mining Company leased the mine from Hyak in 1983 and drilled the gold-bearing shear zone.

Amoco Minerals Company had a small crew in the Bradfield Canal Quadrangle doing assessment work, geochemical sampling, and mapping. Noranda, in a venture with Occidental Minerals, examined old gold prospects on Douglas Island. Placid was active in the Berners Bay area north of Juneau at Kensington.

Alaska Peninsula

Frequent news releases were made by the Alaska Apollo Gold Mines, Ltd., (Vancouver) regarding their activities in the Alaska Peninsula-Aleutian Island

acres of state land under lease. Diamond Alaska Coal Company manager R.B. Stiles said recently that a \$500 million construction project could be launched by 1986. Meadowlark Farms, a subsidiary of AMAX, conducted environmental base-line studies of plant and animal life on leases in the Nenana coal field near Healy.

A Fairbanks group formed the Delta Coal Company to produce and market coal from the Jarvis coal field, which is located about 40 mi south of Delta Junction. A federal lease was obtained, and the EIS was completed. Drilling is planned for 1984, and the expected markets include the Tok and Delta Junction communities and Fort Greely.

In 1981, DGGS was funded by the state to assess the coal resources of northwestern Alaska, principally to help determine if regionally mined coal rather than costly fuel oil could be utilized for heat and power in the villages. Drilling and geological investigations during the 1982 and 1983 seasons indicated a reserve at least 3.4 million tons of lignite at the old Chicago Creek Coal Mine near Deering (Seward Peninsula) and a large but uncalculated reserve of bituminous coal in the Cape Beaufort area on the northwest coast. Other sites investigated [including the Unalakleet area (fig. 12)] appear either not to warrant further work or are located within federal preserves where mining is not allowed.

BLM reports that a preference-right lease to 5,000 acres in northwest Alaska will be issued to the Morgan Coal Company. The lease application was initiated in the 1960s, and several legal issues, including the implications of ANILCA, cloud the future of the lease.



Figure 12. The Unalakleet coal-drilling project was conducted by the Hawley Resource Group under contract by the DNR-DGGS 'Northwest Coal Investigations Project.' Thrasher & Associates was the drilling contractor. Photograph by C.C. Hawley and Associates, 1983.

Uranium

Markets and prices for uranium remain very poor, and no new significant uranium exploration was reported during the past year. However, uranium claims are held on the Seward Peninsula, in the Circle area, and in southeastern Alaska. The Yukon Mining Company of Alaska (Fairbanks) explored for uranium and base and precious metals in interior Alaska. Standard Metals conducted assessment work on the Cub claims at Bokan Mountain on Prince of Wales Island.

Mineral Development in 1983

Introduction

Alaskan mineral-development expenditures during 1983 were \$27.8 million, down 33 percent from record 1982 levels, but above those of 1980 and 1981 (table 3). Development expenditures for coal in south-central Alaska and asbestos in the eastern interior region were down from last year. The number of precious-metal development projects dropped from 1982 levels, particularly in south-central and interior Alaska. Because the Red Dog project is considered to be in the development stage, base-metal expenditures are up substantially from previous years (table 3).

Some projects described below may not fit a narrow definition of development, but they are

included because industry announcements or activities place them in this category (fig. 13). In some cases, development-stage projects are notably absent because the companies involved indicated that their record keeping does not distinguish between exploration, production, or development expenditures. Projects such as the Alaska Gold Company dredges at Nome are considered to be in full production. Other development projects described in previous surveys by Bundtzen, Eakins, and Conwell (1982) and Eakins and others (1983) have been suspended reflecting the nature of development projects responding to complex market conditions, lack of financing, and other economic factors.

region. The company completed a 20,000-ft surface and underground drilling program at the old Apollo and Sitka Mines on Unga Island in the Shumagin Island group. The Empire Ridge area east of the Apollo Mine may have a potential for production. These activities are further discussed in the development section.

Teton, in a joint venture with RAA, also explored for precious metals on Unga Island. They had a 15-person crew in the area and reported 4,500 ft of drilling. Teton, headquartered in Casper, Wyoming, and a subsidiary of United Nuclear Corporation, opened an office in Anchorage to manage its Alaskan projects.

RAA conducted geochemical and geophysical surveys and geologic mapping on Aleut and Bristol Bay Native Corporation lands on the Alaska Peninsula and the Aleutian Islands looking for precious metals.

E.L. Friend, Jr., and C.C. Lucas filed an application with the U.S. Army Corps of Engineers to dredge for gold on 10 claims near Sandpoint on Popof Island. The material would be removed by divers using a suction dredge.

Coal

Hawley Resource Properties, Inc., operator for the Valley Coal Company partnership that includes Rocky Mountain Energy and Sun Eel Shipping Company, conducted a drilling program on Matanuska Valley coal leases northeast of Palmer (fig. 10).



Figure 10. Drilling on the west side of Wishbone Hill, Matanuska field, by Valley Coal Company-Rocky Mountain Energy joint venture. Photograph by R.D. Merritt, 1983.

The leases cover 3,000 acres in the Wishbone Hill area. Thirty-two holes were drilled on the property and some bulk testing was performed. Substantial reserves of good quality coal in the 12,000 to 13,000 Btu/lb range were discovered. An in-house feasibility study by Rocky Mountain Energy, Inc., is currently in progress.

In 1983, exploration and mapping of the Bering River coal field by the Korean Alaska Development Corporation (KADCO) and the Chugach Natives, Inc., followed two previous drilling seasons. The Chugach Natives, Inc., acquired 70,000 acres of coal lands under the Alaska Native Claims Settlement Act, 30,000 acres of which were scheduled for geologic mapping under an agreement with KADCO. KADCO, which is composed of the Hyundai and Samsung Corporations, and the Chugach Natives, Inc., recently formed the Bering Development Company. The joint venture hopes to annually export over 2 million tons of high-quality coal to South Korea. A state-funded study of the transportation needs of the project was recently completed by the Wheelabrator Frye Company for the city of Cordova.

Placer U.S. (formerly Placer Amex, Inc.) conducted environmental, engineering, and marketing studies on their Beluga coal-field leases. Diamond Alaska Coal Company, in joint venture with Chuitna Coal Company, conducted a bulk-sampling program and preliminary engineering-design and environmental studies in the Beluga coal field southeast of Placer U.S. leases (fig. 11). The joint venture holds 20,000



Figure 11. Bulk sampling 'blue pit,' Beluga coal field by Diamond Alaska Coal Company. Photograph by R.D. Merritt, 1983.

Table 3. Mineral-development expenditures by commodity, 1980-83.

	1980	1981	1982	1983
Base metals	\$ 5,000,000	\$ 5,945,000	\$10,270,000	\$19,500,000
Precious metals	5,750,000	11,400,000	19,320,000	7,112,500*
Industrial and structural materials	1,200,000	7,000,000	4,251,000	1,000,000
Coal and peat	NR	345,000	7,750,000	250,000
TOTAL	\$11,950,000	\$24,690,000	\$41,591,000	\$27,862,500

* \$1,487,500 derived from 27 small placer-gold-mining companies.
NR = not reported

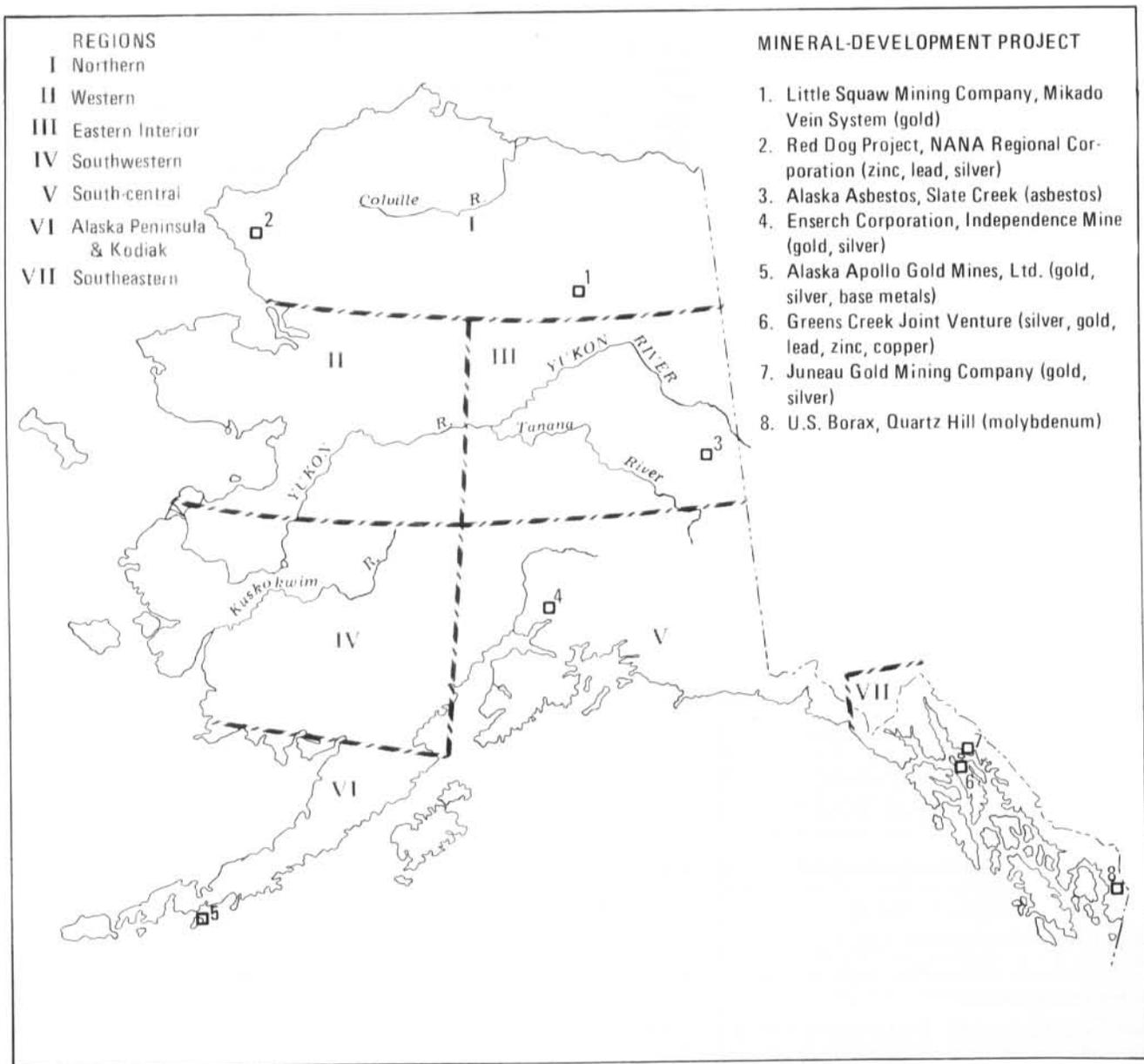


Figure 13. Selected mineral-development projects in Alaska, 1983.

**Mikado Vein System and
Little Squaw Gold Mining Company
Placer Deposits, Chandalar District,
Northern Region**

(loc. 1, fig. 13)

Hard-rock gold lodes have been developed intermittently since 1909 near the head of Tobin Creek in the Chandalar district, northern Alaska region. The lodes consist of northwest-trending, crosscutting, quartz-carbonate-gold veins that average about 1 oz/ton gold. In 1979, lode operators for Little Squaw Gold Mining Company resumed development and seasonal production of the Mikado vein system, and ore was processed through a 125 ton/day (TPD) cyanide leach-flotation plant on the property. An estimated 10,000 oz of gold have been recovered during the last several years. Chandalar Development Corporation (CDC) is the current operator.

In the recent past, 25 to 50 individuals were seasonally employed. Various economic factors, including lack of developed reserves and the high cost of operating in this remote region, prevented lode production in 1983. In 1983, underground development drilling and drifting in the 200-ft main level of the Mikado structure and at the new Envelope prospect blocked out ore for the 1984 operating season.

**Red Dog Project,
Cominco-NANA Regional Corporation,
De Long Mountains,
Northern Region**

(loc. 2, fig. 13)

The Red Dog property is a world-class, black-shale hosted, zinc-lead-silver-barite deposit of Mississippian to Pennsylvanian age (Plahuta and others, 1983). It is located in the De Long Mountains of northwestern Alaska, about 80 mi north of Kotzebue. The deposit is owned by NANA Regional Corporation and operated by Cominco. Two primary mineral deposits have been defined: the 'Main' deposit, which is bisected by Red Dog Creek, and the 'Hilltop' deposit, which is located about 1/2 mi to the south. Both fine-grained bedded and coarse-grained vein sulfides are present. Cominco geologists believe the deposits formed as submarine exhalations in a tensional tectonic environment.

Tikkanen (1983) and Green (1983) summarized the exploration history of the deposit. By 1982, drilling of the 'Main' deposit indicated reserves of 85 million tons of 17.1 percent zinc, 5.0 percent lead,

and 2.4 oz/ton silver. The 'Main' orebody is estimated to be 5,000 ft long, 1,500 ft wide, and approximately 100 ft thick. In 1982 and 1983, additional drilling of the 'Main' deposit confirmed the earlier reserve estimates, and drilling of the 'Hilltop' deposit has added significant reserves of fine-grained massive-sulfide ore. The 'Hilltop' deposit is up to 95 ft thick, dips to the south, and contains metal values similar to the 'Main' deposit.

In 1983, the Red Dog project advanced into a preliminary development phase. Environmental, mine-design, mill-tailings-disposal, transportation-network, government-agency-interactions, and overall mine-feasibility studies have been conducted.

At present, a road is favored over rail transport to a Chukchi Sea port facility about 60 mi from the deposit. A draft EIS has been released by the EPA, the lead federal permitting agency. Governor Bill Sheffield recently recommended that the state become involved in the infrastructure planning phase of the project. Infrastructure costs are estimated at 40 percent of the total \$390 million in capital costs needed to put the mine into production. A 4-ton bulk sample was obtained for mill testing by drilling large diameter holes through the 'Main' ore zone. Preliminary results indicate that fine grinding and precise metallurgy are necessary to provide high-grade concentrates from the ore.

The agreement between the NANA Regional Corporation and Cominco requires local hire to the maximum extent possible.

**Alaska Asbestos, Slate Creek,
Eastern Interior Region**

(loc. 3, fig. 13)

Alaska Asbestos is a joint-venture project between Tanana Asbestos Corporation, a wholly owned subsidiary of Doyon Regional Corporation (Doyon) and GCO, a subsidiary of International Paper Company. WGM is the principal operator. The joint venture was organized to explore, evaluate, and develop an asbestos deposit on land owned by Doyon near Eagle. Estimates through 1982 show reserves in three deposits of 61 million tons of 5 to 6 percent asbestos fiber that range in quality from 4A through 7D, Quebec Standard Specification. The exploration stage was essentially completed during the 1981-82 operating seasons.

Development drilling utilized a large 12-in.-diam core barrel to provide samples for bulk laboratory testing and to support or revise indicated reserve classifications. About 1,000 ft of drilling was conducted in 1983, and results show somewhat higher

fiber grades than those indicated in previous narrow-diameter exploratory drilling. Principal efforts in 1983 were directed at obtaining additional mill tests and researching market opportunities. Doyon recently indicated slippage in development timetables that had previously forecast production by 1990. Pacific Rim countries are expected to be the recipients of the fiber products when a stable marketing system is established.

**Miscellaneous Placer-Gold
Development Work,
Eastern Interior and South-central Alaska**
(various locations)

Twenty-seven mining companies reported a total of \$1.48 million in expenditures (or an average of \$55,000 each) for placer-gold developments in eastern interior, southwestern, and south-central Alaska. Most were small companies preparing for initial production from a variety of placer deposits: four companies were involved with ongoing production activities. Development work included grid-style churn, resonant, and reverse air-circulation drilling, overburden removal and general ground preparation, camp construction, and minor road building. The cost of mechanized heavy equipment was not generally included. At one of the larger properties on Valdez Creek, Camindex drilled 10,300 ft on the 1,200-acre Tammany Channel property. Smith (1981) provided a geologic framework for gold-placers in this district and conducted seismic studies of the channel and bench gravels of the area. Reserves of approximately 360,000 yd grading 0.085 oz/yd gold were proven by project consultant WGM in preparation for the 1984 production season.

**Independence Mine, Hatcher Pass,
South-central Region**
(loc. 4, fig. 13)

The Independence Gold Mine, located approximately 70 mi north of Anchorage, has produced in excess of 165,500 oz of gold. In 1979, Starkey Wilson obtained an option on the property and, in 1981, Enserch Corporation (Dallas, Texas) became a 50-percent partner. Coronado Mining became the mine operator for the partners. During 1981, extensive underground exploration and development were conducted, and 3,000 tons of ore grading 0.5 oz/ton was stockpiled. The ore occurs in quartz veins that occupy north-northwest-trending shear zones along the southern border of the Talkeetna Batholith. The

veins contain pyrite, arsenopyrite, molybdenite, galena, tetrahedrite, and free gold. Stockpiled ore has been treated in a 150-TPD mill near the mine site. The mill contains jig and flotation units, a batch-cyanide system, and a Merrill-Crowe precipitation circuit. The mine and mill facility were dedicated in August 1982. In November 1982, Coronado suspended operations for an undisclosed period, citing problems with recovery in the mill as the reason for closure.

Company officials have not released total expenditures for the project, but some sources estimate development costs through 1983 at \$6 million. This figure includes construction of the new mill, living quarters for 30 workers, and several thousand feet of development drifting (including a 3,150-ft access tunnel).

In 1983, the tailings pond was sealed with a bentonite or Hypalom (TM) extract. Test runs of mill ore produced satisfactory results, but production of gold from mill runs is unknown. An undisclosed amount of subsurface work was also conducted on the property.

**Alaska Apollo Gold Mines, Ltd.,
Alaska Peninsula**
(loc. 5, fig. 13)

The Apollo and Sitka lode systems, located on Unga Island 550 mi southwest of Anchorage, are the most westerly gold mines in North America. Between 1894 and 1906, the Apollo and Sitka veins produced 107,000 oz of gold from 500,000 tons of ore. Minor intermittent activity occurred after 1906. The deposits consist of crosscutting shears and veins that are associated with Tertiary volcanism in the Alaska-Aleutian volcanic arc. The deposits contain gold and silver with substantial amounts of copper, zinc, and lead. The current owner of the property is Alaska Apollo Gold Mines, Ltd., (Alaska Apollo) formerly Catalina Energy and Resources, Ltd., which is headquartered in Vancouver, British Columbia. The following summary includes both exploration and development activities on the property.

During the winter of 1981-82, the Sitka Mine was dewatered to the 250-ft level, and the Apollo No. 1 shaft was dewatered to the 450-ft level. With the shafts dewatered and several levels cleaned out, an intensive but inconclusive program of geologic mapping and sampling was undertaken to substantiate an inferred reserve estimate of 2.2 million tons of ore.

At least \$4 million was expended on the property from 1980 to 1983. Work in 1983 included 24 diamond drill holes totalling 20,000 ft, channel

sampling, and the reopening and mapping of underground mine workings. This work resulted in indicated ore reserves of 130,000 tons on the Shumagin structure, one of eight defined ore zones. According to Woodman (1983b), the company acquired land for shipping facilities and has a contract with Phoenix Marine Engineering Company to dredge tailings at the head of Delarof Harbor on Unga Island. Arctic Resources Drilling, Inc., (Anchorage) is the project driller. The engineering consulting firm of Pinock, Allen, and Holt, Inc., is working with Alaska Apollo on various feasibility studies. Conceptual mill designs include a 1,000-TPD plant mounted on a floating barge and subsequently 'sunk' into a shoreline facility.

Greens Creek Joint Venture Southeastern Region

(loc. 6, fig. 13)

During 1973, Pan Sound Joint Ventures, a group composed of Marietta Resources International, Exalas Resources Corporation, Texas Gulf Resources Corporation, and Noranda began mineral-exploration activities in southeastern Alaska. In 1977, Pan Sound Joint Ventures announced the discovery of significant base metal-precious metal deposits at Greens Creek, about 18 mi southwest of Juneau. Initial drilling results indicated the presence of exceptionally high-grade, apparently stratiform massive-sulfide ore bodies in volcanic-sedimentary rocks of Devonian age. By 1978, in-place reserves of 2.1 million tons grading 10 percent combined copper, lead, and zinc, about 9 oz/ton silver, and 0.10 oz/ton gold were announced. In 1982, reserve estimates increased to 3.5 million tons grading 10 percent combined zinc, lead, and copper, 12 oz/ton silver, and 0.16 oz/ton gold. Ore reserves in 1983 were increased to 4 million tons of 8 to 10 percent zinc, 2.5 percent lead, 0.5 percent copper, 10 oz/ton silver, and 0.1 oz/ton gold.

The passage of ANILCA in December 1980 allowed development of the Greens Creek Joint Venture deposit, which is in a nonwilderness area of the Admiralty Island National Monument. The federal EIS permitting process for mine development was completed in January 1983. The U.S. Forest Service, lead agency in the EIS permitting process, recommended a development plan very similar to the plan proposed by Noranda. Many industry analysts believe this project is the most likely major mining project in Alaska to achieve on-schedule production. The mine is expected to operate at a capacity of 850 TPD and employ several hundred individuals. Workers will commute from Juneau, 18 mi east of the deposit.

The U.S. Forest Service has confirmed the validity of eight core mining claims, but the validity of other important portions of the claim block has not been determined even though geology, shallow drilling, geochemistry, and geophysics attest to continuity of ore horizons in this additional ground.

ANILCA specifies that claims must be perfected and declared valid by December 2, 1985. Noranda believes it will be very difficult to obtain all necessary validity information via surface drilling by that date. Additionally, the company argues that such claims are best proved by subsurface development drilling during mine operation, which would eliminate the need for immediate surface trenching, helipad construction, and other environmental disturbances.

In 1983, Noranda requested relief from the time restraint placed on these proved claims by asking for minor adjustments in the boundary of Admiralty Island National Monument. In December 1983, a draft EIS for Admiralty Island National Monument was released. The preferred alternative would move the northern boundary of the Monument to exclude 17,225 acres that include the Greens Creek deposit and add 18,174 acres in the popular Young Lake area to the Monument. While a decision has not been made on this alternative, the state supports the boundary adjustment.

In 1980, a 4,224-ft adit and a 424-ft cross-cut were completed to provide access for underground diamond drilling and possible bulk sampling of the orebody. Environmental base-line work included investigations of water quality, wildlife, fishery resources, marine resources, air quality, archaeological resources, and meteorology and a review of socioeconomic factors. Transportation to and from the site has been entirely by helicopter. Road and facility-site studies continued in 1983, and construction of an access road connecting Young Bay to the mine site will commence in 1984.

In 1983, after acquiring the interest previously held by the Martin Marietta Corporation, Anaconda became a partner with Noranda at Greens Creek; both companies now own 33.9 percent of the project. Other owners are Texas Gulf Resources Corporation (12.3 percent), Bristol Bay Resources, a subsidiary of Bristol Bay Native Regional Corporation (11.2 percent), and Exalas Resources Corporation (8.7 percent).

Juneau Gold Mining Company, Southeastern Region

(loc. 7, fig. 13)

Juneau Gold Mining Company is continuing development of a dredging and milling operation to process 4 million tons of Alaska Gastineau mill



Figure 14. Juneau Gold Mining Company mill at Thane, Alaska. Photograph by T.K. Bundtzen, January 1984.

tailings at Thane, 4 mi south of Juneau. Of the 11 million tons of tailings deposited on the tidelands in Gastineau Channel between 1915 and 1920, only an estimated 4 million tons are available for recovery (to a depth of 60 ft) by a floating 'cutter' dredge (fig. 14). Rate of production is estimated at 300 tons/hr with an estimated reserve base of about 4½ yr. Key units in recovery of fine gold lost during earlier mining operations are a bank of centrifuges. About 25 percent of the gold is recoverable as 'free' gold that can be melted into bullion on-site. Concentrates containing occluded gold will be shipped to Asarco's Tacoma smelter for processing. Future on-site developments may utilize thiourea as a dissolution agent to recover gold.

U.S. Borax, Quartz Hill Molybdenum Deposit, Southeastern Region (loc. 8, fig. 13)

U.S. Borax continued development work on their Quartz Hill molybdenum deposit. Based on more than 250,000 ft of diamond core drilling conducted from 1974 to 1982, U.S. Borax estimates a mineral deposit in excess of 1.5 billion tons of minable ore grading 0.136 percent molybdenite. This figure includes several hundred million tons of near-surface ore that grades better than 0.2 percent molybdenite.

Quartz Hill was located in the Tongass National Forest. In December 1978, when the Misty Fiords National Monument was established—and proposed as a wilderness area—Quartz Hill was included. In 1980, with passage of ANILCA, a 149,000-acre exclusion area surrounding Quartz Hill was granted to allow the project to proceed. Since 1975, data on meteorology, snow, hydrology, water quality, vegetation, wildlife, coastal and marine biology, physical and chemical oceanography, archaeology, and socioeconomics have

been collected. U.S. Borax estimates the cost of these studies through 1983 has exceeded \$14 million, and total project expenditures to date approach \$75 million. In July 1982, a final EIS for access-road construction and bulk sampling of the ore body was issued by the U.S. Forest Service.

On August 5, 1983, the Interior Board of Land Appeals approved patent applications submitted by U.S. Borax for 32 lode claims in Misty Fiords National Monument. The 9.5-mi-long access road started last year was completed in August at a cost of over \$1 million per mi. Attending the road-opening ceremonies were Senators Ted Stevens and Frank Murkowski, Representative Don Young, and Governor Bill Sheffield. South Coast, Inc., (Ketchikan) employed about 75 workers to complete the task. Subsequently, a 5,000-ton bulk sample was trucked to the dock and eventually delivered to Hanna Research Center in Minnesota. The testing program involves crushing and processing the bulk sample to help design the Borax mill and to establish environmental standards.

Bechtel, Ltd., is conducting various feasibility studies. Work in 1983 included water-supply, power-requirement, and work-force-analysis studies. Conceptually, a power plant located on Tunnel Creek will supply 75 MW of power. Plans also indicate the construction of a refinery at Grays Harbor, Washington, to convert molybdenite concentrates into salable products, including chemicals. Bechtel, Ltd., is searching for sources of fresh water to supply the milling process. Ore would be fed to a primary crusher at the mine site and then conveyed through a 4-mi-long tunnel to a concentrator. Electrical braking on the conveyor system would generate some power requirements for the mine. Tailings from the concentrator would be conveyed through a 6-mi-long tunnel to Boca de Quadra, a possible submarine-disposal site.

In 1983, U.S. Borax announced that workers will be housed in Ketchikan rather than at the mine site. This will eliminate the cost of constructing a town site and will minimize disturbances to the Misty Fiords National Monument.

According to the project timetable, the mine-construction phase will begin in 1984 and production will begin by 1987. However, these phases will require a careful study of market trends and approval of all necessary federal and state permitting agencies. Molybdenum is critical to the manufacture of high-strength steel, high-temperature alloys, and corrosion-resistant materials. Although the molybdenum market is presently depressed, D.L. Finney, Ketchikan manager, believes that world demand will grow sufficiently to accommodate the entry of this major mine into the market.

Mineral Production in 1983

Introduction

The value of 1983 mineral production—excluding petroleum—is estimated at \$232.4 million, an increase of over 18 percent from 1982 levels (table 4). Large increases in the value of sand and gravel and building stone are responsible for this increase. Leading the list is sand and gravel, \$120.0 million; gold, \$67.6 million; building stone, \$25.0 million; and coal, \$18.0 million. Production of tin, silver, platinum, antimony, soapstone, and jade amounted to approximately \$1.6 million, an increase of 14 percent from 1982 levels. Value of sand and gravel, building stone, and silver increased 32, 39, and 67 percent, respectively, over 1982 levels, but gold and tin showed slight declines from the previous year. Coal, platinum, soapstone, and peat remained at about the same levels. Antimony production occurred in the Kantishna district.

Producing gold-mining camps, coal mines, and sand-and-gravel operations in Alaska (1983) are

indicated on figure 15. Mining seasonally employed at least 2,500 individuals, of whom approximately 400 were involved in sand-and-gravel and building-stone operations. Placer mines, most of which operated between April and November, employed at least 2,000 individuals.

As in previous surveys by Bundtzen, Eakins, and Conwell (1982) and Eakins and others (1983), production statistics were derived from 220 DGGs questionnaires returned by private companies and individuals, the USBM, the Alaska Railroad, and from private consultations with knowledgeable individuals. Historical production of gold, sand and gravel, and coal are compiled in figures 16-18. Because all information is provided voluntarily, the totals in tables 4 and 5 for 1983 Alaskan nonfuel mineral output are conservative.

Gold production is difficult to estimate. Sources used to obtain 1983 gold-output figures include information from a) 25 consultants familiar with activities in 30 mining districts in Alaska, b) DGGs questionnaires and other volunteered information, including data from about 100 mechanized placer

Table 4. Mineral production in Alaska, 1981-83.^a

	Volume			Value (\$)		
	1981	1982	1983	1981	1982	1983
Metals						
Gold (oz)	134,000	174,900	169,000	55,200,000	69,960,000	67,600,000 ^b
Lead (lb)	W	None	None	W	None	None
Mercury (lb)	W	W	None	W	W	None
Antimony (lb)	None	None	22,400	None	None	25,000
Platinum (oz)	900	W	W	200,000	150,000	100,000
Silver (oz)	13,420	22,000	33,200	111,360	198,000	332,000
Tin (lb)	106,000	198,000	215,000	700,000	1,365,000	1,100,000
Tungsten (stu)	305	NR	NR	56,000	NR	NR
Subtotal				56,267,360	71,673,000	69,157,000
Industrial minerals, coal, and peat						
Jade and soapstone (ton)	W	W	2.3	200,000	W	42,000 ^c
Sand and gravel (mt)	46.0	45.0	50.0	88,200,000	91,000,000	120,000,000
Building stone (mt)	5.36	3.40	5.27	26,360,000	15,600,000	25,000,000
Subtotal				114,760,000	106,600,000	145,042,000
Coal (mt)	800,000	830,000	803,000	17,600,000	18,000,000	18,000,000
Peat (yd ³)	W	10,000	15,000	W	150,000	200,000
TOTAL				188,627,360	196,423,000	232,399,000

^aFrom DGGs questionnaires, interviews with mine operators, USBM data, and confidential information.

^bAverage price of gold in 1983 assumed \$400/oz.

^cDoes not include jade from NANA Regional Corporation Kobuk operations.

mt = million short tons

W = withheld

stu = short ton units

NR = not reported

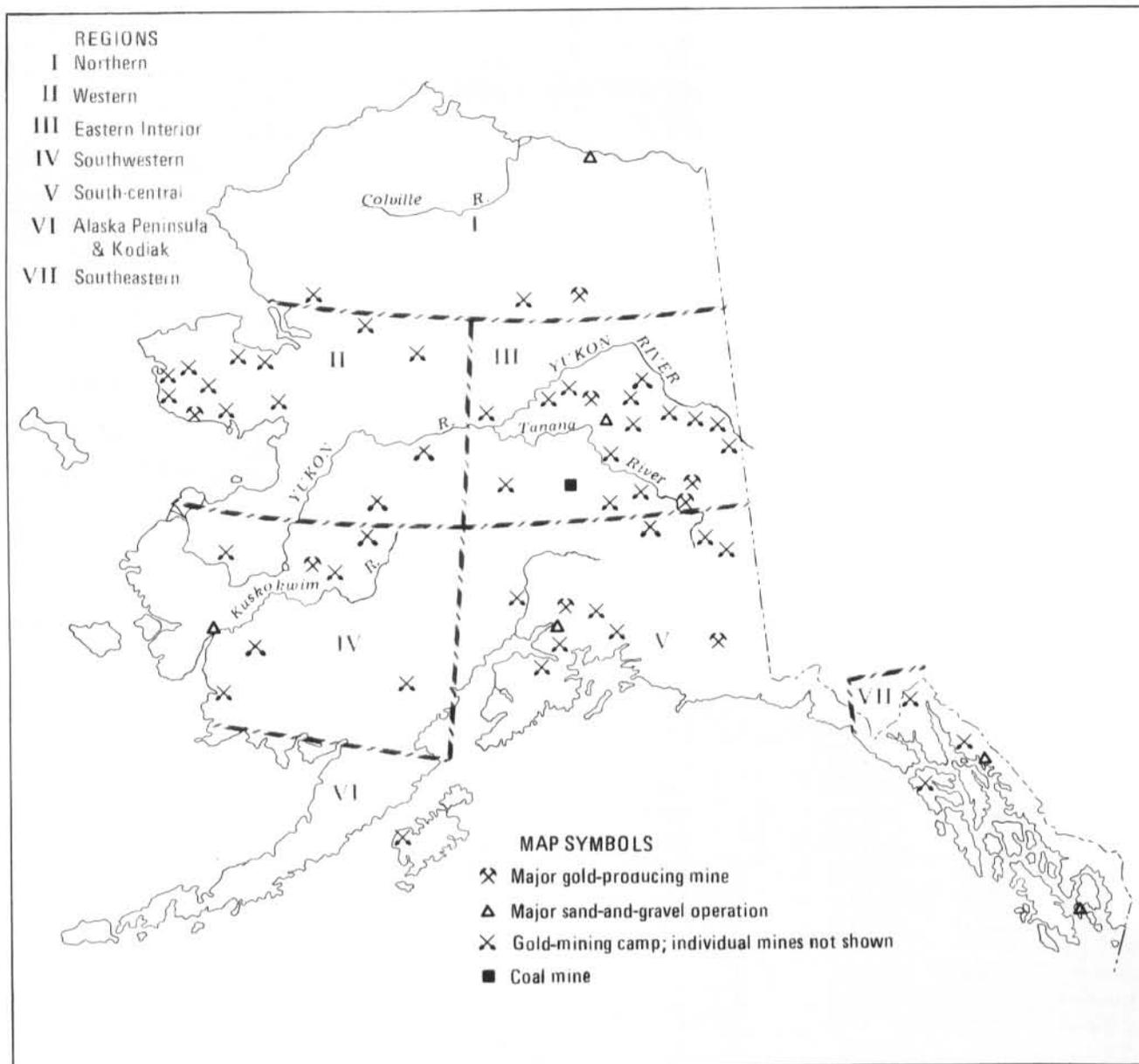


Figure 15. Producing gold-mining camps, coal mines, and sand-and-gravel operations in Alaska, 1983.

mines statewide, c) company news releases and annual reports to stockholders, and d) estimates of gold bullion refined from two precious-metal refiners.

Results are summarized in table 5 and show that in 1983, about 296 mechanized placer mines and about 40 recreational ventures produced approximately 169,000 oz of gold and 18,000 oz of by-product silver. These figures represent a decrease of 3.4 percent from 1982 levels. Within the error limits of this survey, gold production remained approximately the same as during the previous year. However, within various districts, gold and silver production fluctuated widely from previous years. Several factors contributed to these fluctuations. In parts of western, northern, and eastern interior Alaska, an exceptionally dry season resulted in water shortages that significantly affected placer-mine production.

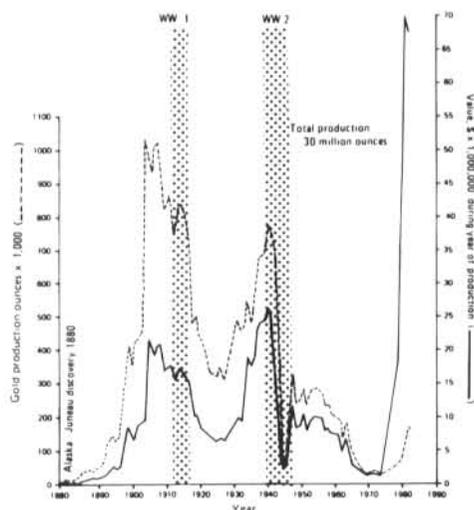


Figure 16. Gold production in Alaska, 1880-1983.

Table 5. Gold production in Alaska by region, 1983.

Region and district(s)	Major operators	Production (troy ounces)
Northern	15	6,200
Chandalar		
Shungnak-Noatak		
Koyukuk-Nolan		
Western	35	41,000
Nome		
Kougarok		
Port Clarence		
Fairhaven		
Candle		
Ruby		
Solomon		
Koyuk		
Council		
Koyukuk-Hughes		
Eastern Interior	180	85,000
Circle		
Livengood		
Fairbanks		
Fortymile		
Manley-Eureka		
Richardson		
Bonnifield		
Kantishna		
Rampart		
South-central	38	20,800
Cache Creek		
Nizina		
Chistochina		
Valdez Creek		
Kenai Peninsula		
Nelchina		
Southwestern	25	15,500
Innoko-Tolstoi		
Iditarod-George River		
Nyac		
Crooked Creek		
Goodnews Bay		
Lake Clark-Mulchatna		
Moore Creek		
Southeastern and Alaska Peninsula	3	500
TOTAL	296	169,000

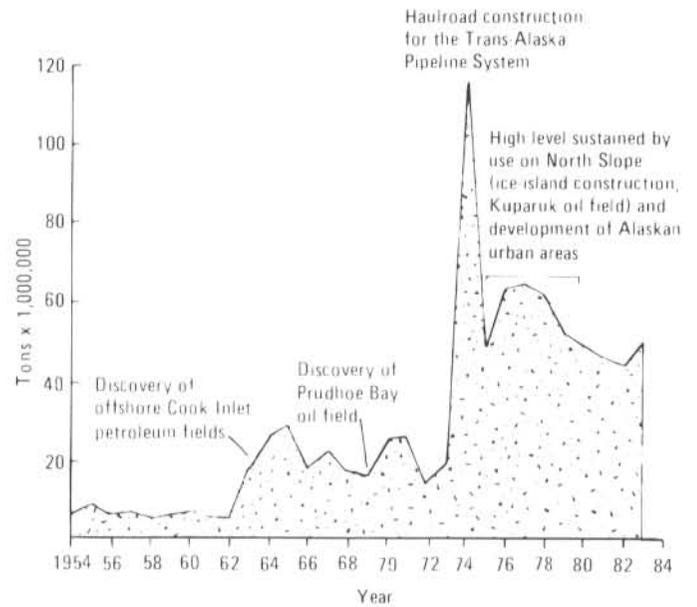


Figure 17. Sand-and-gravel production in Alaska, 1954-83.

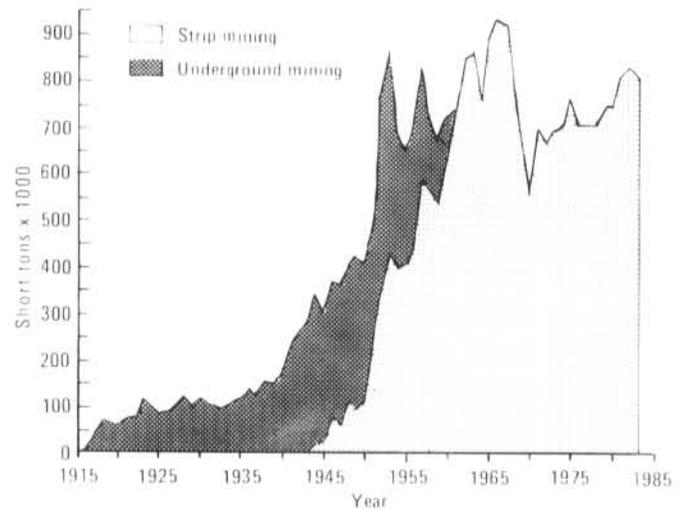


Figure 18. Coal production in Alaska, 1915-83.

Depletion of reserves, evident in districts such as Circle, Rampart, and Richardson, caused production levels to drop from 1982 levels. The great Klondike district in Yukon Territory also experienced a similar depletion in reserves, but production levels were equal to or above the previous year; over 150 mechanized placer mines operated in the north's 'biggest of all' placer-gold district (fig. 19).

According to DGGs questionnaire respondents, enforcement of environmental regulations in the Nyc area and other mining districts negatively affected gold-production levels. The collapse of Delta Smelting and Refining (Fisher, 1983) left many Alaskan miners with substantial losses. Some miners needed gold held by the company to fund development work in the 1983 season. There was almost no lode-gold production in the state in 1983.

On the positive side, several of the state's largest producers, including Canadian Natural Resources (CNR) at Livengood and the Alaska Gold Company at Nome and Hogatza, had record gold outputs. The Kantishna mining district produced more gold in 1983 than in any year since 1905. Healthy seasons were also recorded in the Wrangell Mountains, Chistochina, and Valdez Creek areas.

The price of gold fluctuated from nearly \$480 in January to about \$380 at the end of 1983, with an average annual price of \$408 or about the same as 1982. Although gold started off stronger in 1983 than in 1982, economic conditions are assumed to be approximately the same in both years.

Silver in Alaska is produced primarily as a by-product of placer gold. However, two lode mines shipped primary silver ore in 1983, and hence total silver output increased significantly from the previous year. Tin, antimony, platinum, and soapstone were derived from small-scale mineral developments. Total production of sand and gravel was obtained



Figure 19. Large open-pit placer mine, Bonanza Creek, Klondike district, Yukon Territory, Canada. Photograph by T.K. Bundtzen, 1983.

from the USBM; output from various regions of the state was mainly derived from questionnaires and interviews.

Forecasts for 1984 mineral output are speculative. Consumption of sand and gravel may significantly decrease because construction of ice islands and other projects on the North Slope is expected to drop from 1983 levels. Building-stone output will probably remain at near record levels because an increase in transportation-facilities construction is expected. Usibelli Coal Mine forecasts a significant increase in coal production in 1984 with the initiation of coal shipments to Korea. On the short term, gold output is expected to remain at approximately the level established during 1980-83. Placer reserves are being depleted in several eastern interior districts where significant production occurs. However, increased lode production; offshore, bench-gravel, and 'deep-ground' exploitation; improved recovery technology; and mill-tailings recovery may more than offset projected decreases in placer-gold production. Forecasts for production of other metals cannot be made, and exploitation of those commodities is dependent on complex market conditions.

Metals

Northern Region

Gold and silver were the only metals produced in the northern region. Fifteen placer mines produced 6,500 oz of gold and about 700 oz of byproduct silver, about 25 percent less than in 1982. An exceptionally dry year in the Koyukuk-Nolan area and lack of lode production contributed to the decrease. Principal producing streams continue to be Porcupine, Emma, Linda, Vermont, Union, Archibald, and Nolan Creeks in the historic Wiseman district. Water shortages caused some operations to remain dormant throughout the year. However, small-scale operations on Crevice Creek and in the Wild Lake area enjoyed good returns for their efforts. Wild River Ventures continued to operate their underground drift mine and installed additional mining equipment. Small amounts of placer production occurred in the Shungnak and Noatak areas, but specific levels are unknown.

Canadian Barranca Corporation operated their placer mine in the Chandalar district, but CDC did not mill hard-rock gold ore from the Little Squaw-Mikado vein system in 1983. However, they expect to resume lode production in 1984.

Western Region

An estimated 35 placer mines produced at least 41,000 oz of gold and 4,500 oz of silver, an increase of 19 percent from 1982 estimates.

The largest producer continues to be the Alaska Gold Company, which operates two 9-ft³ bucketline dredges in the Nome fields and an 8-ft³ unit at Hogatza on the lower Koyukuk drainage. Experienced dredge hands, success in the thaw fields, and overall company management resulted in one of the company's best performances since their 1975 startup. Approximately 140 individuals worked during the peak of the operating season, and about 35 were employed year-round, a significant economic boost for the historic mining town of Nome. Currently about 1 million yd³ have been blocked out in front of Dredges 5 and 6 by thaw-field development drilling. Hence, the company has achieved their objective of having 2 yr of reserves developed for the dredges. Additionally, at least 25 yr of drilled reserves are said to remain.

Two 2 ½-ft³-capacity 'gold boats' owned by the Engstrom and Tweet families operated on Quartz and Henry Creeks on the central Seward Peninsula. Steve Peterson operated his floating dredge in the Council area.

Lost River Mining Company operated their placer-tin mine on Cape Creek and shipped 100 barrels of cassiterite to a smelter in Laredo, Texas. This mine continues to be the largest primary source of this strategic metal in the United States; twelve individuals were employed.

A unique discovery occurred on Colorado Creek in the Cripple Mountains 40 mi north of McGrath. During stripping operations, Rosander Mining Company discovered an exceptionally well-preserved woolly-mammoth skeleton in muck overburden. The company subsequently donated the discovery to the University of Alaska Museum (fig. 20), and museum personnel (under the direction of R.C. Betts) excavated the skull, most of the 15,000-yr-old skeleton, and other important artifacts, including hair, skin, and scavenger remains. DGGs arranged to have the skull flown to Fairbanks on a fuel back-haul. The tusks and skull are on display in the museum in Fairbanks.

Eastern Interior Region

The eastern interior region produced 85,000 oz of gold, about 50 percent of the state's total gold output—and about the same as previous years. Six mines each produced in the 2,500- to 4,000-oz range, and many others produced at the 'several-hundred-ounce' level. The largest recorded production was that of the CNR placer mine at Livengood, which reported a total production of 11,700 oz of placer gold during 1983.

The Circle district was again the state's most



Figure 20. Mammoth skull and tusks uncovered by Rosander Mining Company, Colorado Creek, Tolstoi district, Alaska. Photograph by J.T. Kline, 1983.

active district with 42 medium-to-large mechanized mines and 80 to 100 smaller and recreational ventures, about the same as last year. Bullion production, however, was down from 1982 levels, largely due to exhaustion of reserves in some drainages. Some of the best performers in the district have improved recovery techniques so they can mine previously worked ground.

Production decreased in the 40-Mile, Manley, Rampart, and Richardson areas due to decreased reserve bases and water shortages; placer reserves in the two latter districts have largely been mined out, and a new phase of exploration is in progress. The Fairbanks, Livengood, Bonnifield, and Kantishna areas showed increases in production of placer gold, with the latter having its best year since 1905 (fig. 21). Approximately 11 barrels of cassiterite were recovered from a placer-mining operation in the Tozi-Moran area west of Tanana.

Nick Begich, Jr., mined approximately 150 tons of silver-gold ore grading 75 oz/ton silver with significant gold values at the Weiler deposit in the Kantishna mining district (fig. 22). The rich ore was flown by helicopter from the mine site to the Denali Park Highway, where it was trucked to Fairbanks. The ore was then concentrated at the Mohawk Oil and Gas Company mill in Fox.



Figure 21. Aerial view of Fish Creek mining area, Fairbanks district, Alaska. Photograph by M.S. Robinson, 1983.



Figure 22. Miner hand-mucking ore at the Wieler silver-gold deposit, Kantishna district, Alaska. Photograph by Robert Hoekzema, 1983.

John Millhouse mined 20 tons of high-grade antimony ore from the Slate Creek Mine in the Kantishna district. Early in the year, Tricon, Inc., ran a pilot plant using amalgamation at the Grant Gold Mine in the Fairbanks district, and several hundred tons of mill tailings were run through the improved recovery system.

Southwestern Region

Twenty-five well-established operators in the Flat, Innoko, Crooked Creek, George River, and Nyac areas produced 15,500 oz of gold or about 9 percent of total 1983 production in the state (fig. 23). This represents a 20-percent decrease in production from previous years. Much of this decrease is attributed to the shutdown of the Northland Dredging Company's 6-ft³ bucketline dredge in the Nyac district early in the season. The company was refused a permit by the U.S. Army Corps of Engineers to cross the Tuluksak River. This operation was previously one of the largest producers of gold in the 49th state. The company is working to solve environmental and engineering problems so that it may operate in 1984. The 3-ft³ dredge of the Tuluksak Dredging Company, also in the Nyac area, was in production.

The Goodnews Bay platinum dredge operated for 30 days during the 1983 season, but most of the company's efforts continued to center on bulk sampling of previously mined tailings and improvement of recovery methods aboard the dredge.

South-central Region

Twenty-five placer mines in the south-central region provided almost 21,000 oz of gold in 1983, about the same level of production as during previous years. No lode gold was produced.



Figure 23. Twenty-one-oz. gold nugget recovered from placer mine in southwest Alaska. Photograph by Bill Laird, 1983.

The largest producers include the Ranchers Exploration and Development Corporation on Slate Creek in the Chistochina area; Talmo, Inc., in Wrangell National Park-Preserve; and Nelchina Mines, Inc., in the Nelchina district. Efficient management and innovative recovery systems have contributed to the success of these operations despite their locations in remote, mountainous terrane.

A pilot plant was operated on the Denali bench gravels in the Valdez Creek district in preparation for larger scale mining. Three new placer-mining ventures initiated production in the Chistochina district north of the Nabesna Road cutoff.

Silver Star Mining recovered 24 tons of high-grade silver-gold ore from their mine in the Kotsina drainage in Wrangell National Park-Preserve and intends to increase production in 1984. The Fern Development Corporation continued development preparatory to opening a lode-gold mine in the Willow Creek district. Likewise, Dan Renshaw and Gold Cord Development Corporation drove drift at the Gold Cord Mine to connect underground workings in preparation for lode-gold mining activities. Mill tests and other activities were conducted at the Independence Mine in 1983.

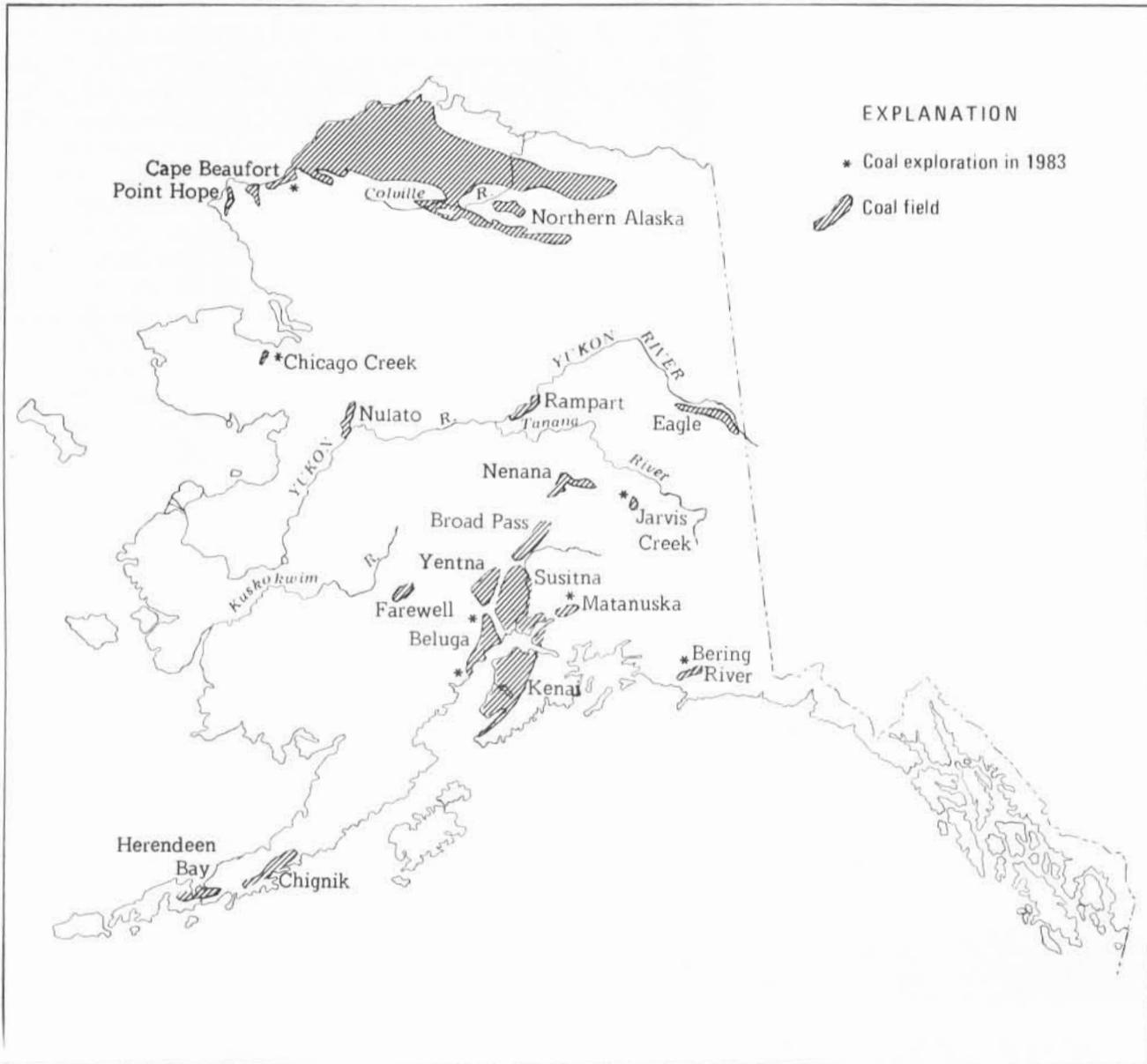


Figure 24. Location of principal coal fields in Alaska.

Southeastern Region and Alaska Peninsula

Metal output from these two widely separated regions is poorly known, but believed to be low. John Schnabel operated a placer mine in the Porcupine district near Haines, and at least two other nearby placer deposits were worked. Gold and silver production may increase dramatically if plans to process mill tailings in the Juneau and Chichagof districts are realized. Activities of the Juneau Gold Mining Company at Thane are described in the development section.

Coal and Peat

Principal coal fields in Alaska are shown in figure 24, and a summary of coal resources in Alaska and representative analyses of Alaskan coals are shown in tables 6 and 7, respectively. The Usibelli Coal Mine, which was the only major coal mine in Alaska during 1983, produced an estimated 803,000 short tons of subbituminous-C coal from a dragline-strip mine operation mining the Suntrana Formation in the Nenana coal field (fig. 25). About 180,000 tons are used to fuel the GVEA power plant at Healy, and the remaining 625,000 tons are hauled on the Alaska Railroad to the University of Alaska, the Fairbanks Municipal Utilities System, and several interior military-installation power plants. About 20,000 tons are sold annually for space-heating needs in interior Alaska.

The 1983 season was one of preparation and expansion for the Usibelli Coal Mine. An initial 1984 test shipment of coal by Sun Eel Corporation for



Figure 25. Former strip-mine pit on Healy Creek, Nenana coal field, Alaska. Photograph by R.D. Merritt, 1983.

the Korean Electric Power Company will boost 1984 coal production at Healy to about 860,000 tons. A 15-yr contract was finalized during 1983 and provides for the annual export of up to 880,000 tons of coal to South Korea. A harbor and facilities for unloading railroad cars and loading coal onto ships are under construction at Seward; the harbor must be dredged to accommodate the large ships. Hence, coal production at Healy is expected to roughly double from current levels by 1987. Usibelli's expansion has included a new \$6-million tipple (fig. 26), a 46,000-ft² office-workshop complex at the mine, a new fleet of 75-ton WABCO haul trucks, and purchase of a D-10 Caterpillar tractor. The successful delivery of Healy coal to the Korean market may send positive signals to other potential buyers of Alaskan mineral products.

Minor amounts of coal were recovered by individuals in the Homer and Matanuska coal fields for space-heating requirements. The Premier Mine, a former producer in the Matanuska coal field, did not operate in 1983. Owner Paul Omlin sold his interest to a larger consortium interested in a potential export market.

The state of Alaska has been granted approval by the U.S. Department of Interior to administer the Alaska Surface Coal Mining Control and Reclamation Act. The state is drawing on the Abandoned Lands Reclamation Fund to study reclamation needs. The 'Alaska coal mined land inventory' (Harker, 1983) was prepared by DOWL Engineers and Plangraphics, Inc., on contract with DMEM. Priorities for measures to correct hazardous conditions are being established, and the regulations adopted for environmental protection have been published.

Horticultural peat is mined from four pits in the Fairbanks area and from at least two pits near Willow. Production during 1983 from all sources is estimated at 15,000 yd³. Peat continues to be evaluated as an energy or horticultural resource in several bush villages, including McGrath and Dillingham.



Figure 26. New \$6-million tipple at the Usibelli Coal Mine, Healy, Alaska. Photograph by R.D. Merritt, 1983.

Table 6. Summary of the coal resources in Alaska (in millions of short tons). Modified from McGee and Emmel, 1979.

	Measured reserves	Indicated resources	Hypothetical resources
Northern Alaska coal province	250	150,000	to 4,000,000
Cook Inlet-Susitna Lowland coal province	Over 2,500	11,000	over 1,600,000
Beluga and Yentna fields	2,500	10,000	to 30,000
Kenai field	0.5	320	to 150,000 ^a
Matanuska field	50	120	to 500
Broad Pass field	10	50	to 500
Nenana-trend coal province (includes Farewell-Little Tonzona field)	3,500	7,000	to 17,000
Other interior coal occurrences	---	---	to 3,000
Bering River field	60	100	to 3,500
Chignik Bay-Herenden Bay fields	20	200	to 3,000
ALASKA TOTAL	>6,300	>168,000	>5,600,000

^aIncludes offshore deposits to 2,000 ft.

^bIncludes offshore deposits to 10,000 ft.

Table 7. Representative analyses of Alaskan coals on as-received basis.

Coal area	Moisture (%)	Volatile matter (%)	Fixed carbon (%)	Ash (%)	Sulfur (%)	Heating value (Btu)	Rank ^a
Arctic Slope							
Foothills	2-10	31-36	53-58	4-15	0.1-0.3	10,000-13,500	Hvcb
Coastal Plain	8-20	30-36	38-50	3-20	0.2-0.8	7,700-10,700	Subb
Nulato	1-10	25-40	47-65	3-22	0.2-0.6	9,100-9,750	Hvcb
Eagle	2-15	20-45	40-55	2-22	0.2-0.6	10,900-11,500	Mvb
Nenana	10-31	21-43	24-45	3-30	0.2-1.2	6,200-9,800	Subc
Jarvis Creek	20-25	35-45	25-35	5-15	0.3-1.5	7,800-9,500	Subc
Broad Pass	20-35	27-35	20-28	10-20	0.2-0.4	5,500-7,100	Lig
Susitna lowland	10-30	28-40	25-45	3-30	0.1-0.7	6,200-9,500	Subc
Kenai	20-27	30-38	25-35	3-25	0.2-0.4	6,500-8,500	Subc
Matanuska Valley							
Wishbone Hill	3-9	32-45	38-51	4-22	0.2-1.0	10,400-13,200	Hvbb
Chickaloon	1-5	14-24	60-72	5-20	0.4-0.7	11,960-14,400	Lvb
Anthracite Ridge	3-9	7-11	65-81	7-20	0.2-0.7	10,720-14,000	Sa
Bering River	1-8	13-17	65-91	2-18	0.1-1.0	11,000-15,000	Lvb
Chignik-Herenden	7-8	32-35	45-51	7-12	0.2-0.4	11,300-11,800	Hvbb

^aSa = semianthracite; Lvb = low-volatile bituminous; Mvb = medium-volatile bituminous; Hvbb = high-volatile B bituminous; Hvcb = high-volatile C bituminous; Subb = subbituminous B; Subc = subbituminous C; Lig = lignite.

Industrial Minerals

Introduction

The value of industrial-mineral production amounted to \$145 million during 1983, an increase of over 36 percent from 1982 levels (table 4). Value of both sand and gravel and building stone increased uniformly from the previous year. Statewide uses of sand and gravel continue to be concentrated in the North Slope oil fields and in Alaska's four largest urban areas—Anchorage, Fairbanks, Juneau, and Ketchikan. Approximately 70 gravel pits and 50 stone quarries operate intermittently to meet government and private construction needs.

Fill constitutes the main use in volume (90 to 93 percent), followed by concrete aggregate and bricks (4 to 5 percent); asphaltic concrete (1 to 2 percent), road base and covering (1 to 2 percent); and snow-and-ice control, gunnite, and plaster (1 percent). Building stone is mainly used in urban areas for reinforcement and ornamental applications.

Northern and Western Region

About 75 percent of sand-and-gravel use in Alaska is concentrated in the North Slope petroleum fields and directly associated with oil-and-gas development projects. A principal use in 1983 continued to be construction of gravel islands in the Beaufort Sea for oil-rig placement; each island requires 1 to 2 million tons of aggregate. Continued development of the Kuparuk oil field and transportation and pipeline construction were other major applications.

Gladden and Stanley (1983) described an innovative new method of gravel mining during construction of the North Slope Borough's new \$10 million Nuiqsut runway. The method employs gravel-bed mining from flood-plain deposits using floating dredges. The gravel is pumped to the construction site via a slurry pipeline. North Slope Borough consultant Mike Weston designed the dredges while Rittenhouse-Zeman and Associates of Anchorage developed the fill-placement system. This unique method could cut aggregate-haulage costs considerably on the North Slope.

The NANA Regional Corporation continued production of high-quality jade in the Jade Mountains east of Kotzebue. Development and production activities on the mine site included diamond core drilling, excavating, slabbing with a diamond saw, and transporting the jade to Kotzebue, where it is marketed under Jade Mountain Products, Inc.

Eastern Interior Region

At least one million tons of aggregate were produced from seven pits in the Fairbanks area. The chief producers include Fairbanks Sand and Gravel, Inc., who operate off the Old Richardson Highway, and EVECO, Inc. (Ace Construction Company) in Fox. Fairbanks Sand and Gravel utilizes a 4½-ft³ bucket-clam dredge on a 27-acre state lease on the Tanana River flood plain. Production during 1983 of 123,888 tons was the same as previous years. EVECO, Inc., employed a sophisticated double-trommel washing plant and produced several sizes of aggregate and substantial quantities of placer gold. Because of excellent exposures of both frozen-muck overburden and ancient stream-gravel deposits, their mine site became the center of attention during the 1983 Fourth International Conference on Permafrost. Scientists from over 50 countries visited with the cooperative and informative mine operators.

The Carroll-Vondra Partnership (Yutan Construction Company) operated the Brown's Hill Basalt Quarry near Badger Road east of Fairbanks. An estimated 540,000 tons of basalt was produced for use as riprap, road metal, crushed fill, and ornamental stone. The company reports its production is dependent on local economic conditions and on the state's needs. Weather is an important factor that affects the length of the operating season. Usually 10 individuals are employed from May to October.

About 2 tons of soapstone, talc, and magnesite were quarried in the upper Salcha River area for handicraft applications.

Southwestern Region

About 100,000 tons of aggregate were mined from point-bar and other deposits along the lower Kuskokwim River for use in the Bethel area. The city of McGrath also recovered several hundred tons of pebbly gravel from lag deposits dredged in the Kuskokwim River for road repairs. City planning efforts have concluded that nearby Candle Mine dredge tailings offer the best source of aggregate for construction on a proposed 5,000-ft-long runway.

South-central Region

Eight private pit operators reported a total production of 4,902,457 tons of gravel from south-central Alaska. Pits developed by Anchorage Sand and Gravel in Palmer and Alaska Gravel Sales in the Anchorage municipality are the largest producers. Records submitted by W.F. Coghill of the Alaska Railroad show that in 1983, 4,397,611 tons of gravel

were hauled from Palmer to Anchorage—a 59 percent increase from the previous record level set in 1982. The high level of gravel haulage during the last 3 yr is an important factor in the railroad's current operating profitability. The recent acquisition of four new GP-49 locomotives specifically designed for heavy industrial loads (Woodman, 1983a) will facilitate gravel and mineral haulage in the rail belt.

Sherman C. 'Red' Smith reported production of agricultural-quality limestone and building stone from quarries on the Kenai Peninsula.

Some soapstone was mined in Grubstake Gulch near Palmer for handicraft applications.

Southeastern Region

Incomplete returns from four operations indicate a production of 252,000 tons of sand and gravel in the Southeastern region—down somewhat from previous years. The largest producer was Hildre Sand and Gravel (Juneau Ready-Mix, Inc.), which mines from two Lemon Creek pits north of Juneau.

Ketchikan Ready-Mix and Quarry, Inc., produced approximately 80,000 tons of basalt for shot rock near Ketchikan—exceeding their forecasted 10-percent increase in production from 1982 levels. They also expect to increase production levels in 1984.

Alaska Peninsula

About 35,000 tons of sand and gravel were reportedly produced by two operators in the Alaska Peninsula region, primarily by Aleutian Aggregate Ventures (Anchorage), which operated a crushing operation on Unalaska Island.

Drilling Activity in 1983

Introduction

Contract drilling of placer, coal, and hard-rock deposits in 1983 totalled about 243,000 ft. This represents a 40-percent drop in mineral-drilling activity from an adjusted 1982 total of 404,000 ft. The decline was due to major reductions in coal-exploration drilling and placer thaw-field drilling (the latter was not included in previous annual reports). Hard-rock drilling, expected to decline dramatically, was only slightly below 1982 levels.

Placer Drilling

Contract placer drilling totalled 53,000 ft in 1983. Exploration drilling accounted for 23,000 ft and consisted primarily of a combination of reverse-circulation rotary drilling and resonant drilling.

Because much placer exploration involves in-house drilling, this figure does not fully express total placer-exploration footage.

The balance of placer footage was from thaw-field development drilling in which frozen placer gravels are drilled to bedrock to allow the installation of thaw pipes. Cold water, pumped into the pipes during the summer season, percolates back up through the frozen gravel and thaws the ground for dredging.

The reported 1982 placer-drilling total of 30,000 ft included only exploration drilling because thaw-field drill footages were not available. The adjusted 1982 total is 124,000 ft. The 1983 figures, therefore, indicate a 23 percent decrease in exploration footage and a 68 percent decrease in development footage. The large 1982 thaw-field footage represented a one-time effort, however, and future annual totals for development drilling should approximate 1983 levels. Future placer-exploration drilling should also remain at 1983 levels if the price of gold remains in the \$100/oz range.

Coal Drilling

Total footage for exploration coal drilling in 1983 was 12,000 ft. This compares with 80,000 ft reported in 1982 and represents an 86 percent decline. The final phase of the DGGs 'Northwest Coal Investigations Project' included approximately 6,000 ft of rotary drilling. The balance of the total footage was drilled for an exploration project in the Matanuska Valley coal field.

No major state coal leaseholders conducted drilling programs during 1983. Mobil Mining and Coal, a leaseholder in the Yentna area, was inactive in 1983 following a large reconnaissance drilling program in 1982. Neither of the two Beluga leaseholders, Placer U.S. (formerly Placer Amex) nor Diamond Alaska, conducted drill programs in 1983. In 1982, Diamond Alaska drilled 50,000 ft of exploration and geotechnical holes, but that effort concluded the company's exploration phase. Significant additional coal drilling on the Beluga leases will occur when development begins. In the Bering River coal field, the Chugach Natives, Inc., continued surficial exploration in 1983, but no drilling was conducted.

The state is evaluating 70,000 acres in the Matanuska Valley for inclusion in a spring 1985 lease sale. The Matanuska Valley coals are of higher rank than subbituminous Beluga or Nenana coals. A strong response to the lease sale may result in significant drilling activity in 1985 or 1986, but drilling levels will probably remain at the present low levels until development of major leases begins.

Hard-rock Drilling

Total footage reported in 1983 for hard-rock drilling was 178,000 ft, down 12 percent from the 1982 level of 200,000 ft. However, given the low metal prices and the worldwide economic weakness that prevailed during 1983, the drop in hard-rock drilling was modest.

As expected, hard-rock drilling continued on properties near or in the development phase. Significant drilling also occurred on recent discoveries where reserves were not well established and on historic precious-metal mines that are being re-examined. A total of 4,900 ft was also drilled under contract to USBM to evaluate the mineral potential of two mining areas in the Denali National Park-Preserve.

Strengthening metal prices, concurrent with the drawdown of metal stocks and a continuing general economic recovery, may enhance 1984 base-metal exploration budgets in Alaska. The present high level of exploration activity that is occurring as historical precious-metal properties are reevaluated will continue if gold prices are stable. Therefore, hard-rock drilling footages may increase in 1984.

Table 9. Companies conducting drilling programs in Alaska, 1983.

Alaska Apollo Gold Mines, Ltd.
Alaska Gold Co.
Anaconda Minerals Co.
Bear Creek Mining Co.
Hawley Resources Group
Cominco American, Inc.
Duval Corporation
Enserch Exploration, Inc.
GCO Minerals Co.
Houston International Minerals, Inc.
Noranda Exploration, Inc.
Noranda Mining, Inc.
Placid Oil Co.
Ranchers Exploration and Development Corporation
Resource Associates of Alaska, Inc.
Silverado Mines
SUM Resources
Sunshine Mining
UNC Teton Exploration Drilling
U.S. Borax and Chemical Co.

Table 8. Drilling contractors active in Alaska, 1983.

Alaska Drill Supply & Equipment Company 7330 Silver Birch Drive Anchorage, Alaska 99502	Exploration Supply & Equipment, Inc. 6727 Seward Highway Anchorage, Alaska 99502	Sedcore Exploration, Ltd. Phillips Field Road P.O. Box 60750 Fairbanks, Alaska 99706
Alsinco 919 Commerce Street Fairbanks, Alaska 99701	Hardrock Construction P.O. Box 6455 Ketchikan, Alaska 99901	Skidmore Machine & Tool Co. P.O. Box 470 Fairbanks, Alaska 99707
Arctic Resources Drilling, Inc. 6361 Nielson Way, Suite 101 Anchorage, Alaska 99502	Interstate Exploration, Inc. 512 West International Airport Road P.O. Box 6166 Anchorage, Alaska 99502	Southeast Drilling Co., Inc. P.O. Box 6612 Ketchikan, Alaska 99901
Boyles Brothers Drilling Co. P.O. Box 4307 Spokane, Washington 99202	Longyear, Inc. 5941 Arctic Boulevard, Unit P Anchorage, Alaska 99502	Sprague & Henwood, Inc. 221 W. Olive Street Scranton, Pennsylvania 18501
Caron North American 8000 King Way Anchorage, Alaska 99502	M-W Drilling, Inc. P.O. Box 10-378 Anchorage, Alaska 99511	Thibideau Drilling Contractors 3864 Peger Road Fairbanks, Alaska 99701
Denali Drilling 6000 'A' Street Anchorage, Alaska 99502	NANA-Coates Diamond Drilling, Inc. 4706 Harding Drive Anchorage, Alaska 99503	Thrasher & Associates, Inc. P.O. Box 114 Nome, Alaska 99762
Diamond Drill Contracting Co. P.O. Box 11037 Spokane, Washington 99211	Salisbury & Dietz, Inc. S. 1815 Lewis Spokane, Washington 99204	Wink Bros. Drilling 1101 Mendenhall Peninsula Juneau, Alaska 99801

References Cited

- Berger, Louis and Associates, 1983, Placer mining...its role in the Alaskan economy: Fairbanks, Department of Commerce and Economic Development, Office of Mineral Development, 22 p.
- Bundtzen, T.K., 1983, Mineral resource modeling, Kantishna-Dunkle mine-study areas: Alaska Division of Geological and Geophysical Surveys Report of Investigations 83-12, 51 p.
- Bundtzen, T.K., Eakins, G.R., and Conwell, C.N., 1982, Review of Alaska's mineral resources - 1981: Department of Commerce and Economic Development Office of Mineral Development, 52 p., 4 sheets.
- Cook, D.J., 1983, Placer mining in Alaska: Fairbanks, University of Alaska Mineral Industry Research Laboratory Report 65, 157 p.
- Eakins, G.R., and Daniels, C.L., 1980, Survey of mining activity in 1977: Alaska Division of Geological and Geophysical Surveys Open-file Report 122, 32 p.
- Eakins, G.R., Bundtzen, T.K., Robinson, M.S., Clough, J.G., Green, C.B., Clautice, K.H., and Albanese, M.A., 1983, Alaska's mineral industry - 1982: Alaska Division of Geological and Geophysical Surveys Special Report 31, 63 p.
- Fernette, J.P., 1983, Permit guidelines for the mineral industry in Alaska: Alaska Department of Commerce and Economic Development Office of Mineral Development.
- Gladden, S.C., and Stanley, Vince, 1983, Dredge fill placement key to North Slope development: Alaska Construction and Oil, v. 24, no. 6, p. 20-21.
- Green, C.B., 1983, Red Dog update: Alaska Miners Journal, v. 11, no. 10, p. 20-21.
- Harker, D.F., Jr., 1983, Alaska coal mined land inventory: Anchorage, Plangraphics, Inc., 268 p.
- Hawley, C.C., and Associates, 1983, Mineral terranes of Alaska 1982: Anchorage, Alaska Environmental Information and Data Center, 7 sheets.
- McGee, D.L., and Emmel, K.S., 1979, Alaska's coal resources: Anchorage, Alaska Division of Geological and Geophysical Surveys individual report, 23 p.
- Plahuta, J.T., Young, L.E., Modene, J.S., and Moore, D.W., 1983, Geology of Red Dog lead-zinc deposit: Alaska Miners Journal, v. 11, no. 12, p. 11.
- Renshaw, D.E., 1983, Matanuska-Susitna Borough, summary of mineral resources: Palmer, Alaska, The Mapmakers, 48 p.
- Schaff, R.G., and Merritt, R.D., 1983, Alaska's coal provinces and resources: International Conference on Coal, Minerals, and Petroleum, Anchorage, 1983.
- Smith, T.E., 1981, Geology of the Clearwater Mountains, south-central Alaska: Alaska Division of Geological and Geophysical Surveys Geologic Report 60, 72 p.
- Thurrow, Greg, 1983, Geology of Coal Creek tin prospect, south-central Alaska: Alaska Miners Journal, v. 11, no. 12, p. 24.
- Tikkanen, George, 1983, Red Dog zinc-lead potential immense: The Northern Miner, August 14, 1983, p. 4.
- Woodman, Betzi, 1983a, Alaska Railroad acquires production model locomotives: Alaska Construction and Oil, v. 24, no. 11, p. 28-30.
- _____, 1983b, Shumagin Island gold mine shows promise of good returns: Alaska Construction and Oil, v. 24, no. 9, p. 28-30.

Appendix A

Selected New Major Claim Blocks and Additions to Claim Blocks Staked in 1983^a

Quadrangle	Claim-group name	Number of claims in 1983	New claim block or number of claims added	Land status where known F-federal S-state	Commodities where known	Claim holder
Northern Region						
Noatak	Ore (and others)	3,578	186	F&S	Pb, Zn, Cu lode	Cominco
Wiseman	Bench	103	16	F	Placer	Silverado Mines (U.S.), Inc.
	Gold channel	51	New	F	Placer	P. & K. Dolphin
Chandalar	PN (and others)	130	New	F	Lode	L. Jordan and others
Western Region						
Teller	Fox	110	31	S	Sn lode	Anaconda
Bendeleben	Sunshine (and others)	115	23	F	Lode	World Evangelism, Inc.
Candle	Mud, Sand, Gravel	110	8	S		Noranda
Melozitna	Golden Eagle	59	New	F	Placer	K. Dolphin
Nome	Au	36	New	S	Au tidewater placer	Greatland Exploration, Ltd.
Solomon	SC	45	New	S	Au tidewater placer	Greatland Exploration, Ltd., Phoenix Marine Engineering, Inc.
Nulato	Okie, Dokie, Hokie, Honker	3,695	3,233	S	Lode	Anaconda
	BC claims	1,026	New	F	Lode	Anaconda
Ruby	Lost claims	50	New	S	Lode	Green Mining and Exploration
Ophir	Cloud	220	New	S	Lode	Anaconda
Medfra	Win, Won	155	58	S		Duval
	Ash	37	New	S		Duval
	Storm	206	New	S		Anaconda
Eastern Interior Region						
Bettles	Midnite Sun	124	New		Lode	R. Aumiller
Livengood	Amy	67	New	S		S. and R. Rybachek
	Grace	46	23	S	Placer	E. Wolff, Hallougil Corp.
	Chat	51	New	S		Greatland Exploration, Ltd.
Circle	Brown Bear	72	New	S	Lode	C. Alexander, W. Peppler
	Miller Creek	41	New	S	Placer	R. Vetter, W. Shope, M. Ringstad
Eagle	RML	70	New	S	Placer	R. Lucas
	JD	55	New	S	Placer	J. Griffith, D. McCall
	Golden Star	49	New	S	Placer	P. Schmitt
	Redhawk	86	New	S	Placer	R. George
	Merritt and V. Anthony	54	New	S	Placer	D. Galipeau, L. Carter
	Mosquito	55	New	S	Placer	G. Dempsey, B. Richard
Healy	Slate Creek	27	New	S	Placer	WGM
	WTF	56	New	S		HIMCO
	Denali Bench	101	New	S	Placer	J. Egland and others
	Gold Hill	51	New	F	Lode	K. Dolphin
	EFC	26	New		Lode	Noranda
	Rerun ext. SU	33	New	S		HIMCO
Mt. Hayes		132	New	F	Lode	GCO
	AE Barbie	50	New	F	Placer	Alaska Enterprises, Ltd.
	Zackley, UNC	708	367	F	Lode	UNC Teton Exploration, RAA
Tanacross	Bonanza	49	New	F	Placer	J. Lawler
	RML	67	New	S		R. Lucas

^aData based on 1983 federal and state mining-location notices filed with the Division of Mining, Mining Information Office by January 15, 1984. There is a possible 4-mo information lag between claim staking and receipt of claim notices in the Mining Information Office.

Quadrangle	Claim-group name	Number of claims in 1983	New claim block or number of claims added	Land status where known F-federal S-state	Commodities where known	Claim holder
Southwestern Region						
Sleetmute	FS (and others) HJG, HVG	76 289	53 New	S	Placer	C. Fry Greatland Exploration, Ltd.
Lime Hills	BR, LY, LN	344	128	S	Lode	Hunt
Taylor Mtns.	Cass, Kusk (and others)	187	New	S	Lode	Cominco
Lake Clark	LC	49	New	S	Lode	Anaconda
Hiamna	PR	66	New	S	Lode	Anaconda
South-central Region						
Talkeetna	Prospect Cr.	47	10	F	Au placer	Dutch Creek Mining
Talkeetna Mtns.	Joe Cr. below (and others) Diamond	68	37	S	Au	M. Kotter, A. Renshaw (ALR Co.)
		92	New	S	Placer	Diamond Prospecting & Mining
Anchorage	Burning Daylight Our Venture	46	New	S	Placer	J. Black G. and M. Briggs
		124	New	S	Placer	
Seldovia	Red	31	New	S	Placer	Anaconda
Southeastern Region						
Skagway	Marmot (and others)	184	123	F	Au, Ag, Pb, Cu	Southeastern Minerals
Juneau	KNS (and others) Rex (and others)	144	42		Au lode	Placid Oil Noranda
		74	11		Au	
Sumdum	Cook group Sum, Dum	119	22		Au, Pb	Mapco, Inc. E. Twelker, J. Knaebel
		73	New			
Petersburg	Linda, KAH, Odd	155	New	F	Lode	Nicor Mineral Ventures, Inc.
Bradfield Canal	Cantu (and others)	48	New		Lode	Greenwich Resources U.S. Inc.
Craig	Ruby Tuesday, Dark	92	20		Zn, Pb lode	Noranda
Ketchikan	Sea	206	New			C. Ashworth, R. Machray
Dixon Entrance	Kaigani, Billy	83	11		Lode	Noranda

Appendix B

Alaska State, Federal, and Private Agencies Involved in Mineral-development Activities, 1983

STATE OF ALASKA AGENCIES

A. Department of Commerce and Economic Development (DCED)

State Office Building, 9th floor
Pouch D
Juneau, Alaska 99811
(907) 465-2500
Commissioner - Richard A. Lyon

Function: Promotes economic development in Alaska.

Office of Mineral Development (OMD)

675 Seventh Avenue, Station A
Fairbanks, Alaska 99701
(907) 452-7464
Director - John F.M. Sims

Function: Primary advocacy agency within state government for the mining industry. Provides liaison between state government and the private sector. Researches and publishes economic data on Alaskan mining industry. Provides assistance to the mining loan program.

B. Department of Environmental Conservation (DEC)

3220 Hospital Drive
Pouch O
Juneau, Alaska 99811
(907) 465-2600
Permit Information (907) 465-2607
Commissioner - Richard A. Nevé

Function: Issues permits for mining activities that affect air or water quality or involve land disposal of wastes. Sets air- and water-quality standards. Inspects, monitors, and enforces environmental-quality statutes, regulations, and permits. Reviews all federal permits.

South-central Regional Office
437 E Street, Ste. 200
Anchorage, Alaska 99501
(907) 274-2533
Permit Information (907) 279-0254

Northern Regional Office
675 Seventh Avenue, Station J
Pouch 1601
Fairbanks, Alaska 99707
(907) 452-1714
Permit Information (907) 452-2340

Southeast Regional Office
9000 Old Glacier Hwy.
Box 2420
Juneau, Alaska 99803
(907) 789-3151
Permit Information (907) 465-2615

Nome Office
P.O. Box 1171
Nome, Alaska 99762
(907) 443-2600

C. Department of Fish and Game (ADF&G)

P.O. Box 3-200
Juneau, Alaska 99802
(907) 465-4100
Commissioner - Don W. Collinsworth

Function: Protect habitat in fish streams and manage refuges, sanctuaries, and critical habitat. Requires permits for any work involving the blockage of fish passage; equipment crossings or operation in streams with anadromous fish; use, diversion, or pollution of streams containing anadromous fish; construction, exploration, or development work in state refuges, sanctuaries, and critical habitat.

Advises land management agencies through preparation of a) compilations of fish, wildlife and habitat, and public-use information; b) assessments of habitat requirements and potential impacts; c) guidelines and recommendations for preventing, reducing, or mitigating fish, wildlife, habitat, and human harvest losses.

South-central Regional Office
333 Raspberry Road
Anchorage, Alaska 99502
(907) 344-0541

Southeastern Regional Office
230 South Ferry Way
Juneau, Alaska 99801
(907) 465-4290

Central Regional Office
565 University Avenue
Fairbanks, Alaska 99701
(907) 479-3104

Westward Regional Office
Kashervaroff and Mission Rd.
P.O. Box 686
Kodiak, Alaska 99615
(907) 486-4791

Northwestern Regional Office
State Office Building, 1st floor
P.O. Box 1148
Nome, Alaska 99762
(907) 443-2825

D. Department of Natural Resources (DNR)

State Office Building, 11th floor
Pouch M
Juneau, Alaska 99811
Commissioner - Esther C. Wunnicke

1. Division of Geological and Geophysical Surveys (DGGS)

3601 C St., Frontier Building, 8th floor
Pouch 7-028
Anchorage, Alaska 99510
(907) 276-2653

State Geologist - Ross G. Schaff
Deputy State Geologist - William W. Barnwell

Function: Conducts investigations of Alaskan mineral, fuel, and geothermal potential; geologic hazards; construction materials; underground, surface, and coastal waters of the state; archaeological and cultural resources; general geologic inventory. Advises the public and government agencies on geological questions. Performs assays and other mineralogical analyses at DGGS laboratory at the University of Alaska, Fairbanks. Publishes professional reports and brochures. Maintains a library of geological bulletins, reports, and periodicals.

Fairbanks Office
794 University Avenue, Basement (mailing)
794 University Avenue, 2nd floor
Fairbanks, Alaska 99701
(907) 474-7147

Juneau Office
230 S. Franklin, Room 407
Juneau, Alaska 99811
(907) 465-3400, Ext. 39

Eagle River Office
P.O. Box 772116
Fish Hatchery Road
Eagle River, Alaska 99577
(907) 688-3555

DGGS Mineral Laboratory and Assay Office
794 University Avenue, Basement (mailing)
Fairbanks, Alaska 99701
O'Neill Resources Building, 2nd floor
University of Alaska
(907) 474-7122

2. Division of Mining
555 Cordova Street, Olympic Building
Pouch 7-016
Anchorage, Alaska 99510
(907) 276-2653
Director - Pedro Denton

Function: Principal state agency for management of mining industry in Alaska. Maintains mining-information offices formerly operated by DGGS. Assumes minerals functions of defunct Division of Minerals and Energy Management such as mining-claim adjudication; mining leasing; offshore-prospecting permitting; coal leasing; and administration of the surface-mining program, which includes permitting, inspection, and reclamation of abandoned mines.

Mining Information Offices are located at the DGGS Fairbanks and Juneau offices (above) and at:
State Office Building, 2nd floor
P.O. Box 7438
Ketchikan, AK 99801
(907) 225-4181

3601 C Street, Frontier Building, 10th floor
Pouch 7-005
Anchorage, Alaska 99510
(907) 786-2205

(all Division of Mining addresses and phone numbers are subject to change in 1984).

3. Division of Land and Water Management (DL&WM)
555 Cordova Street, Olympic Building
Pouch 7-005
Anchorage, Alaska 99510
(907) 276-2653
Director - Thomas J. Hawkins

Function: Manages the surface estate and resources, including materials (gravel, sand, and rock) and water. Handles statewide and regional land-use planning. Issues water-appropriation permits and certificates, material-sale contracts, and land-use permits and easements for the temporary use of state land and access roads.

North-central District Land Office
4420 Airport Way
Fairbanks, Alaska 99701
(907) 479-2243
District Manager - Jerry L. Brossia

South-central District Land Office
3601 C Street, Frontier Building
Pouch 7-005
Anchorage, Alaska 99510
(907) 276-2653
District Manager - Margaret J. Hayes

Southeast District Land Office
Marine View Building, 4th floor
Pouch MA
Juneau, Alaska 99801
(907) 465-3400
Acting District Manager - Andy Pekovich

4. Division of Forestry
555 Cordova Street, Olympic Building
Pouch 7-005
Anchorage, Alaska 99510
(907) 276-2653
State Forester - John L. Sturgeon

Function: Regulates mining in state forests.

South-central District Forestry Office
3601 C Street, Frontier Building
Pouch 7-005
Anchorage, Alaska 99510
(907) 338-7990
District Forester - Joseph Wehrman

North-central District Forestry Office
3726 Airport Way
Fairbanks, Alaska 99701
(907) 479-2243
District Forester - Lester Fortune

Southeast District Forestry Office
230 S. Franklin St., Room 407
Juneau, Alaska 99801
(907) 465-3400
District Forester - Paul Maki

- E. Department of Revenue
State Office Building
Entrance A, 11th floor
Pouch S
Juneau, Alaska 99811
(907) 465-2300
Commissioner - Robert D. Heath

1. Public Services Division
1111 W. Eighth Street
Pouch SA
Juneau, Alaska 99811
(907) 465-2392
Director - Martin J. Richard

Function: Issues licenses (including mining of minerals for production and sale) and requires the filing of nonresident affidavits and bonding.

2. Audit Division
State Office Building
Entrance B, 11th floor
Pouch SA
Juneau, Alaska 99811
(907) 465-2320
Director - Maureen O'Brien

Function: Administers the mining tax, which is based on net income, including royalties. Upon application, will grant a certificate of tax exemption for the 3½ yr of new mining operations, except for the mining of sand and gravel. Tax returns must be filed annually.

Anchorage Field Office
201 E. Ninth Avenue
Anchorage, Alaska 99501
(907) 276-5364

Fairbanks Field Office
State Office Building
675 Seventh Avenue, Station G
Fairbanks, Alaska 99701
(907) 452-1513

Juneau Field Office
1111 W. Eighth Street, Room 108
Pouch SA
Juneau, Alaska 99801
(907) 465-2333

- F. University of Alaska
Fairbanks, Alaska 99701
(907) 474-7565

1. College of Environmental Sciences
Division of Geosciences
Geology & Geophysics Program (B.S., M.S., Ph.D.)
Department Head - Richard C. Allison

Function: Provides undergraduate and graduate education in geology and geophysics and conducts basic and applied research in the geological sciences. Offers program options in general geology, economic geology, petroleum geology, geophysics, and ice-snow-permafrost geophysics.

2. School of Mineral Engineering
(907) 474-7366
Dean - Nolan B. Aughenbaugh

Function: Conducts laboratory and field studies related to minerals and mining. Publishes reports and general information concerning mining and offers assistance to miners.

Mineral Industry Research Laboratory (MIRL)
210 O'Neil Resource Building
University of Alaska, Fairbanks
Fairbanks, Alaska 99701
(907) 474-7135 or 7136
Director - Nolan B. Aughenbaugh

Function: Conducts applied and basic research on the location, development, and use of Alaska's minerals and coal resources. Conducts studies on exploration, mine and mill development, coal preparation and use, mineral beneficiation, and environmental concerns of the mineral industry.

3. Arctic Environmental Information and Data Center (AEIDC)
707 A Street
Anchorage, Alaska 99501
(907) 279-4523
Director - David Hickok

Function: Engages in information management, transfer and dissemination, and applied research and investigation into resource development and environmental problems. Provides information and data on Alaska and circumpolar arctic environments and natural resources.

FEDERAL AGENCIES

A. U.S. Department of the Interior

1. Bureau of Land Management (BLM)
701 C Street
P.O. Box 13
Anchorage, Alaska 99513
State Director - Michael Penfold
(907) 271-5960 - Public Room

Function: Administers federal lands not managed by other agencies, and all leases on federal leasable minerals, e.g., oil, gas, and coal, phosphates, and oil shale. Arranges for sale of other than locatable and leasable minerals, e.g., sand, gravel, stone, etc. Issues right-of-way and special-use permits. Monitors mining operations to prevent surface damage. Maintains land-status plats and issues patents. Records federal mining claims and annual assessment affidavits.

Anchorage District Office
4700 E. 72nd Avenue
Anchorage, Alaska 99507
(907) 267-1200
District Manager - Wayne Boden

Fairbanks District Office
N. Post, Fort Wainwright
P.O. Box 1150
Fairbanks, Alaska 99707
(907) 356-5399
District Manager - Carl D. Johnson

Nome Field Office
Box 925
Nome, Alaska 99762
(907) 443-2177
Fred Payton, Geologist

2. U.S. Geological Survey (USGS)
Office of the Special Assistant for Alaska
Gould Hall
4200 University Drive
Anchorage, Alaska 99504
Special Assistant to the Director for Alaska - Max Brewer

Function: Investigates and reports on physical resources, the configuration and character of the land surface, the composition and structure of the underlying rocks, and the quality, volume, and distribution of water and minerals.

Alaska Distribution Center (for maps and brochures)
101-12th Avenue
Federal Building
Fairbanks, Alaska 99701
(907) 456-0244

Public Inquiries Office (for information and publications)

Skyline Building, Room 108
508 Second Avenue
Anchorage, Alaska 99501
(907) 277-0577

Fairbanks Branch of Alaskan Geology
University of Alaska
O'Neill Resources Building, 2nd floor
P.O. Box 80586
College, Alaska 99708
(907) 474-7245

3. U.S. Bureau of Mines (USBM)
P.O. Box 550
Juneau, Alaska 99801
(907) 364-2111
Chief - John Mulligan

Function: Performs research on mineral deposits and metallurgy. Handles data on minerals availability and maintains a record of mine names and locations of both past and present mines as well as a mine-map repository.

Anchorage Field Office
2221 East Northern Lights Boulevard, Ste. 110
Anchorage, Alaska 99504
(907) 274-9521

Fairbanks Field Office
206 O'Neill Resources Building
University of Alaska
Fairbanks, Alaska 99701
(907) 479-4277

4. National Park Service (NPS)
Alaska Regional Office
2525 Gambell Street
Anchorage, Alaska 99503-2892
(907) 271-4223
Regional Director - Roger J. Contor
Chief, Lands and Mining - Richard J. Stenmark

Function: Administers lands within the National Park System in Alaska. Manages valid prior-right mining claims in the parklands through plans of operation under the Mining in Parks Act, National Park Service regulations, and other applicable federal and state laws and regulations.

B. U.S. Department of Labor

1. Mine Safety and Health Administration (MSHA)
117-107th Avenue, NE, Room 100
Bellevue, Washington 98004
(206) 442-7037
Western District, Subdistrict Manager - Martin Rosta

Function: Administers mine health and safety for mines other than coal. Conducts training and safety classes for federal and state mine inspectors and mining personnel. Research in mine safety.

2. Coal Mine Safety and Health Administration
P.O. Box 25367
Denver, Colorado
(303) 234-2293
District Manager - John W. Barton

Function: Administers mine safety and health for coal mines. Duties are the same as for mines other than coal, but also certifies permissible equipment for use in coal mines. Does dust inspection. Cooperates with state mine inspectors, who certify foremen and other coal workers. Because there is no mine inspection in Alaska, mine inspectors come to Alaska from Price, Utah, or Denver, Colorado.

- C. U.S. Department of Agriculture
U.S. Forest Service (USFS) Regional Office
Federal Building
P.O. Box 1628
Juneau, Alaska 99802
Regional Forester - John A. Sandor

Function: Administers National Forest System lands under multiple-use principles of the Mining and Minerals Policy Act of 1970 and the National Materials and Minerals Policy Research and Development Act of 1980. Provides joint administration of the general mining laws on National Forest System lands with the Bureau of Land Management. Cooperates with Department of Interior agencies in issuing mineral leases to mitigate surface impact from such activities. Issues permits for disposal of sand, gravel, and stone.

- D. U.S. Department of Environmental Protection (EPA)
Alaska Operations Office
3200 Hospital Drive
Juneau, Alaska 99801
(907) 586-7619
Director - Ronald A. Kreizenbeck

Regional Headquarters
1200 Sixth Avenue
Park Place Building
Seattle, Washington 98101
(206) 442-1200

Regional Administrator - Ernesta Barnes

Function: Regulates effluent discharge and air quality. Issues National Pollutant Discharge Elimination System (NPDES) permits to miners.

- E. Department of the Army
U.S. Army Corps of Engineers
Regulatory Functions Branch
Pouch 898
Anchorage, Alaska 99506
District Engineer - Colonel Neil E. Saling

Function: Regulates work in navigable waters of the United States and the discharge of dredged or fill material into the waters of the United States, including wetlands. Examples of regulated mining activities include roads, bridges, docks, pads, stockpiles, diversions, and causeways.

Write: Attention: NPACO-RF-S, or
Call: James Wood (907) 552-4942

NONGOVERNMENTAL GROUPS AND ASSOCIATIONS

Resource Development Council for Alaska, Inc.
444 Seventh Avenue, Box 100516
Anchorage, Alaska 99510
(907) 278-9615

Northwest Mining Association
633 Peyton Building
Spokane, Washington 99201
(509) 624-1158

Alaska Geological Society
P.O. Box 1288
Anchorage, Alaska 99510

Alaska Miners Association, Inc.
509 West Third Avenue, Ste. 17
Anchorage, Alaska 99501
(907) 276-0347
Earl H. Beistline, President
121 Spruce
Fairbanks, AK 99701
(907) 452-5356

American Institute of Professional Geologists
Box 957
Golden, Colorado 80401
(303) 431-0831

Western Mining Council
Kenai Peninsula Chapter
Oscar H. Bailey, President
Old Nash Road
Seward, Alaska 99664
(907) 224-5963

ORGANIZED MINING DISTRICTS

Forty-Mile Miners Association
Bob Ditman, President
General Delivery
Chicken, Alaska 99732

Circle Mining and Recording District
Del Ackels, President
P.O. Box 1872
Central, Alaska 99730

Seward Mining District
Tom Williams, President
Box 66
Hope, Alaska 99605

Kantishna Mining District
Sam Koppenburg, President
SRD Box 9070
Palmer, Alaska 99645

Livengood-Tolovana Mining District
Rose Rybachek, President
P.O. Box 73069
Fairbanks, Alaska 99707

Yentna Mining District
John Jacobson, President
Anchorage, Alaska
(907) 277-3685

Valdez Creek Mining District
Dave Clark, President
General Delivery
Talkeetna, Alaska 99676

Koyukuk Mining District
Robert Aumiller, President
P.O. Box 80447
College, Alaska 99708

Alaska Miners Association
Nome Chapter
Ron Engstrom, President
General Delivery
Nome, Alaska 99762

Appendix C

Selected Significant Mineral Deposits in Alaska (locations shown in figs. 27-29)

Map
no.

1. Lik, SU - Major strata-bound massive-sulfide (Zn-Pb-Ag-Cd-Ba) deposits in black shale and chert. Inferred reserve (Lik) estimate of 25 million tons of 12 percent combined Pb+Zn and 1.5 oz/ton Ag.
2. Red Dog - At least two major strata-bound massive-sulfide deposits hosted in Permian or Mississippian shales; similar to locality 1. According to Cominco Alaska (February 1982), the 'Main' deposit at Red Dog contains at least 85 million tons of 17.1 percent Zn, 5 percent Pb, 2.4 oz/ton Ag. The nearby 'Hilltop' deposit contains substantial undisclosed reserves.
3. Drenchwater - Strata-bound massive-sulfide (Pb-Zn-Ag) occurrence associated with black shale, chert, and felsic volcanic rocks; 60- by 120-ft exposure averages 17.4 percent Zn, 3.0 percent Pb, and 3.3 oz/ton Ag; numerous sulfide occurrences and strong geochemical anomalies between localities 1-4 and locality 7.
4. Ginny Creek - Hill of massive-barite mineralization; minimum estimate of 1 million tons of barite exposed near the surface.
5. Story Creek - Recently discovered massive-sulfide Zn-Pb-Ag-Cu-Au occurrences hosted in brecciated zones within the Devonian Kanayut Conglomerate or the Lower Mississippian Kayak Shale. Grab samples of high-grade material contain 0.43 percent Cu, 34 percent Pb, 28.8 percent Zn, 0.04 oz/ton Au, and 30 oz/ton Ag.
6. Woosee Creek - Recently discovered massive-sulfide Zn-Pb-Cu-Ag-Au-Cd occurrences in breccia zones within the Devonian Kanayut Conglomerate or the Lower Mississippian Kayak Shale. Random grab samples of mineralized material contain 0.24 percent Cu, 0.37 percent Cd, 44 percent Zn, 0.14 oz/ton Au, and 14.8 oz/ton Ag.
7. Omar-Frost - Cu replacement (similar to Bornite); includes stratiform barite occurrences similar to Ginny Creek (locality 4).
8. Bornite - Major stratiform Cu-Zn deposit in carbonate; 5 million tons grading 4-12 percent copper. Larger reserve estimate of 40 million tons of about 2 percent copper and an undisclosed amount of Zn and Co.
9. Arctic - Major stratiform Cu-Zn deposit in a sequence of metarhyolite, metatuff, and graphitic schist; current drilling indicates reserves of 40 million tons grading 4.0 percent Cu, 5.5 percent Zn, 1.0 percent Pb, and 1.5 oz/ton Ag.
10. Sun - Major strata-bound massive-sulfide deposit in a metarhyolite and schist sequence; drilling through 1976 indicated gross metal values in excess of \$1 billion.
11. Smucker - Massive-sulfide deposit; significant tonnage of Cu-Pb-Zn ore; 3,000-ft strike length; active exploration.
12. Avan Hills - Unexplored chromite occurrences and nickel geochemical anomalies associated with layered ultramafic rocks.
13. Misheguk Mountain - Chromite occurrences in ultramafic rocks; potential exists for similar occurrences.
14. Klery Creek - Lode- and placer-gold deposits worked intermittently from 1909 through the 1930s. Total production through 1931 estimated at 31,320 oz; most production is from placer deposits.
15. Ernie Lake - Strata-bound massive-sulfide occurrence in metarhyolites and metatuffs. Gossan zones are strongly anomalous in Cu-Pb-Zn and Ag.
16. Koyukuk-Nolan mining district - Major placer-Au district; substantial production from 1893 to present. More than 300,000 oz has been produced. Significant deep placer reserves remain.
17. Chandalar mining district - Major Au-producing district; substantial production in excess of 30,000 oz from both lode and placer sources. Significant unmined reserves remain. Active exploration and development of both placer deposits and vein lodes.
18. Porcupine Lake - Stratiform fluorite occurrences associated with felsic volcanic rocks. Grades of up to 25-30 percent fluorite reported.
19. Wind River - Strata-bound massive-sulfide Pb-Zn prospects; grades of up to 5 percent Pb reported.
20. Esotuk Glacier - Mo-Sn-W-Pb-Zn potential in intrusive complex associated with skarns.
21. Bear Mountain - Major stockwork Mo-W-Sn occurrence in intrusive breccia; strongly anomalous Mo-W anomalies in geochemical samples from the region.
22. Cape Creek - Major placer-Sn producer. More than 500 tons of Sn produced between 1935 and 1941; at least 500,000 lb produced in recent years.
23. Buck Creek - Major placer-Sn producer. More than 1,100 tons of Sn produced between 1902 and 1953.
24. Lost River - Major Sn, fluorite, W, and Be deposits. More than 400 tons of Sn produced from lode sources. Inferred reserves estimated at 38 million tons of ore, based on 45,000 ft of diamond drilling.
25. Ear Mountain - Placer-Sn district and Sn-Cu-Au-Ag-Pb-Zn skarn associated mineralization. Area is also anomalous in uranium.
26. Kougarok Mountain - Significant discovery of Sn-greisen mineralization; no published information is available on grade and tonnage.

27. **Hannum** - Stratiform massive-sulfide Pb-Zn-Ag deposit in heavily oxidized zone ranging from 30 to 150 ft thick. Zone is reported to assay up to 12 percent Pb+Zn and 2 oz/ton Ag.
28. **Independence Creek** - Massive-sulfide Pb-Zn-Ag deposit; high-grade ore shipped in 1921 contained 30 percent Pb, 5 percent Zn, and 150 oz/ton Ag. Mineralization restricted to shear zone in carbonates.
29. **Sinuk River** - Stratiform massive-sulfide Pb-Zn-Ag-Ba-F deposits and layered iron deposits. Mineralized zones extend over 8,000 ft along strike.
30. **Nome district** - Major placer- and lode-Au producer. Production in excess of 4,348,000 oz of Au. Sporadic Sb and W production in the past.
31. **Big Hurrah** - Significant lode-Au deposit in black slate and metasediments. Deposit contains some W mineralization and has produced over 10,000 oz Au.
32. **Solomon district** - Major placer-Au district; produced over 250,000 oz of Au.
33. **Kachauik** - Uranium prospect in alkalic intrusive rocks. Highly anomalous geochemical values and uranium concentrations of 1,000 ppm reported.
34. **Omalik** - Stratiform or vein-type massive-sulfide Pb-Zn-Ag prospect in carbonate rocks; produced 300-400 tons of Pb-Zn ore between 1881 and 1900 that averaged about 10 percent Pb and 40 oz/ton Ag. Grades of oxidized zinc ore are reported to be as high as 34 percent Zn.
35. **Windy Creek** - Significant Mo-F mineralization with values as high as 0.15 percent Mo reported.
36. **Quartz Creek** - Significant Pb-Zn-Ag mineralization; grades of 15 percent combined Pb-Zn and 10 oz/ton Ag reported.
37. **Placer River** - Significant Mo-F mineralization disseminated in intrusive rocks. Values of 0.2 percent Mo reported.
38. **Candle Creek** - Placer-Au deposits with significant reserves blocked out. Placer concentrates reported to have significant uranium and galena concentrations.
39. **Poovookpuk Mountain** - Porphyry-Mo mineralization. Grades of up to 0.25 percent reported.
40. **Purcell Mountain** - Uranium occurrences associated with alkalic igneous rocks.
41. **Hogatza** - Placer-Au district. Hog River district produced 209,000 oz of Au from 1930 to 1975. Alaska Gold, Inc., dredge reactivated in 1981. Utopia Creek produced a significant amount of placer-Au between 1930 and 1962.
42. **Flat district** - Major placer-Au district; has produced 1,364,404 oz of Au; district is currently active. Potential exists for the occurrence of significant lode-Au and W mineralization at the Golden Horn deposit and other known lode deposits in the region.
43. **Innoko-Tolstoi district** - Major placer-Au district with significant lode Au-Sb-Hg potential; has produced more than 540,000 oz of Au from placer deposits.
44. **Nixon Fork** - Promising Au-Cu deposits; Nixon Fork Mine has produced more than 40,000 oz of Au from lode sources.
45. **Bonanza Creek** - Significant W discovery along intrusive contact; no published information available.
46. **Ruby district** - Placer Au-Sn district; produced more than 420,000 oz of Au between 1931 and 1960; also contains Pb-Ag prospects with grades reportedly as high as 82 oz/ton Ag.
47. **Hot Springs district** - Placer Au-Sn district; produced more than 450,000 oz of Au and over 720,000 lb of cassiterite through 1981.
48. **Tolovana district (Livengood)** - Placer-Au district; produced more than 387,000 oz of Au since discovery in 1914. Substantial reserves remain.
49. **Fairbanks district** - Seventh largest gold-producing district in U.S., largest producer in Alaska. Has produced more than 7,750,000 oz of Au from placer deposits. Major lode-Au and Sb producer; has produced more than 250,000 of Au and over 4 million lb of Sb through 1970. Production of W exceeds 4,000 short-ton units since 1915.
50. **Mt. Prindle** - Significant uranium-rare earth mineralization. Rock geochemical values of up to 0.1 percent U_3O_8 reported; up to 15 percent rare-earth elements also reported.
51. **Twin Mountain** - Significant W mineralization associated with skarn development along the contact zone of quartz monzonite stock.
52. **Circle mining district** - Currently Alaska's largest producing placer-Au district; has accounted for 850,000 oz of Au since discovery in 1893. Has significant potential for lode-tin, tungsten, and gold mineralization.
53. **Three Castle Mountain, Pleasant Creek, Casca VABM** - Strata-bound massive-sulfide Pb-Zn mineralization. Grades of up to 17 percent Zn and 2 percent Pb reported.
54. **Anderson Mountain, Dry Creek, Virginia Creek** - Significant massive-sulfide Cu-Pb-Zn-Ag prospects. Potential for high-grade deposits reported.
55. **Delta massive-sulfide belt** - Contains at least 30 known massive-sulfide deposits and occurrences. Grade ranges for these deposits are 0.3-1.1 percent Cu, 1.7-5.7 percent Zn, 0.5-2.3 percent Pb, 0.7-2.0 oz/ton Ag, and 0.018 to 0.061 oz/ton Au. A potential reserve tonnage of 40 mt reported.
56. **Mosquito, Peternie** - Porphyry-Mo prospects; grades of up to 0.17 percent Mo reported.
57. **Taurus** - Major porphyry Cu-Mo prospect. Potential for large tonnage of 0.5 percent Cu and 0.05 percent Mo reported.
58. **Big Creek, Ladue** - Strata-bound massive-sulfide Pb-Zn-Ag prospects in metavolcanic rocks.
59. **Slate Creek** - 61 million tons of 5-6 percent high-quality chrysotile asbestos. Potential exists for additional large tonnages of moderate- to high-grade material.

60. Fortymile district - Major placer-Au district. Has produced in excess of 417,000 oz of Au since discovery in 1886.
61. Kantishna district - Major placer-Au and lode Ag-Au-Pb-Zn-Sb-W district. Has produced more than 85,000 oz of placer-Au and about 260,000 oz of lode-Ag and several million lb of Sb. Potential exists for significant Ag-Au-Pb-Zn deposits.
62. Stampede Mine - Major Sb deposit; has produced more than 3.5 million lb of Sb. Stampede area contains anomalous stream-sediment geochemistry indicative of massive-sulfide terranes.
63. Purkypile - Significant Ag-Sn-Be mineralization associated with granitic intrusions. Grades of up to 4.5 percent Sn reported. Potential also exists for uranium and tungsten mineralization.
64. Golden Zone Mine - Major Au-Cu-Ag deposits in breccia pipe. Has produced more than 1,581 oz of Au, 8,617 oz of Ag, and 42,000 lb of Cu. Proven reserves of about 10 million tons of 0.1 oz/ton Au with Cu and Ag reported.
65. Nim Prospect - Porphyry Cu-Ag+Au deposit. Grades of up to 5.0 percent Cu and 9 oz/ton Ag reported.
66. Coal Creek - Greisen-hosted Sn-Cu-W deposit. Reserves of 5 million tons of ore grading 0.25 percent Sn with credits of W and Cu reported.
67. Denali Prospect - At least six small strata-bound Cu lodes that contain some 5 million tons grading about 2 percent Cu with credits of silver.
68. Chistochina - Porphyry-Cu prospects and placer-Au district; has produced more than 177,000 oz of Au and a small amount of Pt from placer deposits.
69. Nabesna Mine - High-grade Au skarn, has produced in excess of 66,960 oz of gold from about 88,000 tons of ore between 1930 and 1941.
70. Spirit Mountain - Massive and disseminated Cu-Ni mineralization in mafic-ultramafic complex.
71. Kennicott deposits - Major stratiform massive-sulfide Cu-Ag deposits; contains some of the highest grade copper lodes ever mined. Deposits have produced more than 1.2 billion lb of Cu and 9 million oz of Ag. Some reserves remain.
72. Binocular and other prospects - Kennicott-type massive-sulfide Cu-Ag deposits.
73. Bond Creek-Orange Hill - Two major porphyry Cu-Mo occurrences; inferred reserves of 850 million tons of ore grading 0.3-0.5 percent Cu and 0.03 percent Mo reported.
74. Carl Creek - Porphyry-copper prospect in altered intrusive complex.
75. Baultoff - Porphyry-Cu prospect in altered intrusive rocks.
76. Horsfeld - Porphyry-Cu prospect.
77. Midas Mine - Major strata-bound massive-sulfide Cu-(Ag-Au-Pb-Zn) deposit. Produced more than 1 million lb of Cu.
78. Ellamar - Strata-bound massive-sulfide Cu-Zn-Au deposit. Has produced more than 16 million lb of Cu, 51,307 oz of Au, and 191,615 oz Ag from about 301,835 tons of ore.
79. Willow Creek, Independence, Lucky Shot, War Baby - Major lode-Au (Ag-Cu-Pb-Zn-Mo) deposits. Produced more than 448,082 oz of Au from the lode sources and about 35,000 oz of Au from associated placer deposits.
80. Latouche, Beatson - Major strata-bound massive-sulfide Cu-Zn-Ag deposits. Produced more than 205 million lb of Cu from 6 million tons of ore. Inferred reserves of 5 million tons of ore grading 1 percent Cu, 1.5 percent Pb+Zn, and 1 oz/ton Ag reported.
81. Rua Cove - Major strata-bound massive-sulfide Cu-Zn deposit. Reserves in excess of 1.1 million tons of ore grading 1.25 percent Cu reported.
82. Red Mountain - Significant chrome occurrence associated with ultramafic complex at Red Mountain near Seldovia. More than 36,000 tons of metallurgical-grade ore shipped through 1976.
83. Red Devil - Major Hg-Sb deposit; high-grade Hg ore hosted in shear zones in Kuskokwim Group sediments. More than 35,000 flasks of Hg produced.
84. Nyac district - Significant placer-Au district. Aniak district (of which Nyac is a part) has produced more than 230,000 oz of Au from placer deposits.
85. Goodnews Bay - Major placer-Pt district; estimated to have produced over 540,000 oz of platinum-group metals (PGM) between 1934 and 1976; largest known resource of PGM in U.S. Possible reserves of 60 million yd³ of deep platinum-bearing gravels remain.
86. Apollo-Sitka Mines - Major lode-Au deposits; produced more than 107,900 oz of Au from ore that averaged about 0.22 oz/ton Au. Inferred reserves reportedly equal to ore mined.
87. Pyramid - Porphyry Cu-Mo deposit; reserves of 100 million tons of ore grading 0.5 percent Cu and 0.03 percent Mo/ton reported.
88. Ivanof - Porphyry-Cu prospect; grades of up to 0.72 percent Cu reported. Potential for large tonnages.
89. Weasel Mountain, Bee Creek - Porphyry Cu-Mo prospect; grades of up to 0.48 percent Cu and 0.035 percent Mo/ton reported. Potential for moderate tonnages of low-grade mineralization.
90. Mike deposit - Porphyry-Mo prospect; grades of up to 0.21 percent Mo reported. Potential for large tonnages of low-grade Mo mineralization.
91. Rex deposit - Porphyry-Cu prospect; grades of up to 0.3 percent Cu reported. Potential for moderate reserves of low-grade mineralization.
92. Kasna Creek - Major stratiform massive Cu-Pb-Zn deposit; reserves of over 10 million tons of ore grading more than 1 percent Cu reported.
93. Magnetite Cove - Massive magnetite skarn deposit; grades of up to 30 percent Fe reported; also contains Zn-Cu-Ag mineralization.

94. Jimmy Lake - Complex Cu-Ag-Sn mineralization; grades of up to 105 oz/ton Ag and 3 percent Cu reported.
95. Marmot - Major stratiform barite-Pb-Zn-Cu-Ag deposit; reportedly consists of a 48- to 60-ft-thick zone of 60 percent barite with a 2- to 8-ft-thick basal zone of massive sulfides that contains 2 percent Pb, 3 percent Zn, 1 percent Cu, 2-4 oz/ton Ag, and 0.12 oz/ton Au.
96. Klukwan - Major Fe-Ti deposits; reported to contain 1-5 billion tons of 11-20 percent Fe and 1.6-3.0 percent Ti.
97. Nunatak - Porphyry-Mo deposit; reserves of 8.5 million tons of ore grading 0.125 percent Mo and 129 million tons of 0.026 percent Mo reported.
98. Brady Glacier - Major Ni-Cu deposit in layered mafic complex. Proven reserves of 100 million tons of ore grading 0.5 percent Ni and 0.3 percent Cu reported; also contains significant Co and Pt concentrations.
99. Mertie Lode and Funtier Bay district - Contains substantial reserves of lode-Au mineralization. Past production totaled 10,000 to 15,000 oz of Au. Deposits also contain significant Ni-Cu and Pb-Zn-Au mineralization. Funtier Bay deposit contains reported reserves of 560,000 tons grading 0.34 percent Ni, 0.35 percent Cu, and 0.15 percent Co.
100. Alaska-Juneau - Major lode-Au deposit; produced more than 3.52 million oz of Au from 88.5 million tons of ore between 1893 and 1944.
101. Chichagof and Hirst Chichagof - Major lode-Au deposits; produced more than 770,000 oz of Au. Chichagof Mine produced about 700,000 oz of Au and 200,000 oz of Ag; Hirst Chichagof Mine produced about 67,980 oz of Au and 20,000 oz of Ag.
102. Mirror Harbor - Ni-Cu mineralization in layered mafic complex; probable reserves of 8,000 tons of 1.57 percent Ni and 0.88 percent Cu, and inferred reserves of several million tons of ore grading 0.2 percent Ni and 0.1 percent Cu reported.
103. Bohemia Basin - Major Ni-Cu-Co mineralization in layered mafic complex; reserves of 22 million tons of ore grading 0.33 percent to 0.51 percent Ni, 0.21-0.27 percent Cu, and 0.04 percent Co reported.
104. Apex-El Nido - Significant lode Au-W deposits; produced more than 50,000 oz of Au.
105. Greens Creek - Major stratiform massive-sulfide Pb-Zn-Cu-Ag-Au deposit; published reserves of 4.0 million tons grading 10 percent combined Pb-Zn-Cu, 10 oz/ton Ag, and 0.10 oz/ton Au.
106. Sumdum - Strata-bound massive-sulfide Cu-Pb-Zn deposit with a potential strike length of over 10,000 ft. Inferred reserves of 26,700,000 tons of ore grading 0.57 percent Cu, 0.37 percent Zn, and 0.3 oz/ton Ag reported.
107. Snettisham - Fe-Ti deposit in mafic intrusive complex; grades of about 18.9 percent Fe and 2.6 percent Ti reported.
108. Tracy Arm - Strata-bound massive-sulfide Cu-Zn-Pb prospect; over 1,100 ft long and up to 12 ft thick. Grades of 1.5 percent Cu, 3.9 percent Zn, 0.76 oz/ton Ag, and 0.013 oz/ton Au reported.
109. Red Bluff Bay - Significant chrome mineralization in ultramafic complex; reserves of 570 tons of material grading 40 percent Cr and 29,000 tons grading 18-35 percent Cr reported.
110. Cornwallis Peninsula - Major strata-bound massive-sulfide Cu-Pb-Zn-Ag-barite deposit; grades of up to 20 percent Pb-Zn and 23 oz/ton Ag reported.
111. Castle Island - Stratiform barite deposit with about 850,000 tons of production between 1963 and 1980; contains Zn, Pb, and Cu sulfides.
112. Ground Hog Basin - Area contains several stratiform massive-sulfide prospects with reported grades of up to 8 percent Pb, 29 oz/ton Ag, and 0.5 oz/ton Au. Area also contains potential for porphyry-Mo deposits.
113. Snipe Bay - Ni-Cu deposit in layered mafic-ultramafic complex; inferred reserves of 430,000 tons of 0.3 percent Ni, 0.3 percent Cu, and 0.13 oz/ton Ag reported.
114. Kasaan Peninsula - Major massive-sulfide Cu-Fe-Au deposits; area has produced over 28 million lb of Cu from ore that averaged better than 2 percent Cu. Reserves of 4 million tons of ore grading 50 percent Fe and less than 2 percent Cu reported.
115. Salt Chuck - Cu-PGM-Ag-Au deposit in contact zone between pyroxenite and gabbro within a zoned mafic-ultramafic pluton. From 1900-41, 5 million lb Cu, over 20,000 oz of PGM, and Au and Ag credits were won from 325,000 tons of ore.
116. Union Bay - Significant Fe-Ti mineralization in ultramafic complex; area also contains Pt and V concentrations.
117. Hyder district - Area produced more than 25,000 tons of high-grade W-Cu-Pb-Zn-Ag ores between 1925 and 1951; area also contains potential for porphyry Mo-W mineralization and massive-sulfide skarn Pb-Ag-Au-W deposits.
118. Jumbo - Produced more than 10 million lb of Cu, 280,000 oz of Ag, and 7,000 oz of Au from 125,000 tons of ore. Reserves of 650,000 tons of ore grading 45.2 percent Fe, 0.75 percent Cu, 0.01 oz/ton Au, and 0.08 oz/ton Ag reported.
119. Copper City - Stratiform massive-sulfide Cu-Zn prospects; grades of up to 12.7 percent Cu, 2.7 percent Zn, 2.5 oz/ton Ag, and 0.2 oz/ton Au reported.
120. Quartz Hill - World-class porphyry-Mo deposit; announced reserves of 1.5 billion tons of ore grading 0.136 percent Mo, which includes 300 million tons with grades exceeding 0.2 percent Mo.
121. Niblack - Stratiform massive-sulfide Cu-Pb-Au-Ag deposit; has produced more than 1.4 million lb of Cu, 11,000 oz Au, and 15,000 oz Ag.
122. Bokan Mountain - Numerous U-Th prospects associated with granitic intrusive complex; produced more than 120,000 tons of ore grading about 1 percent U₃O₈ between 1955 and 1971.

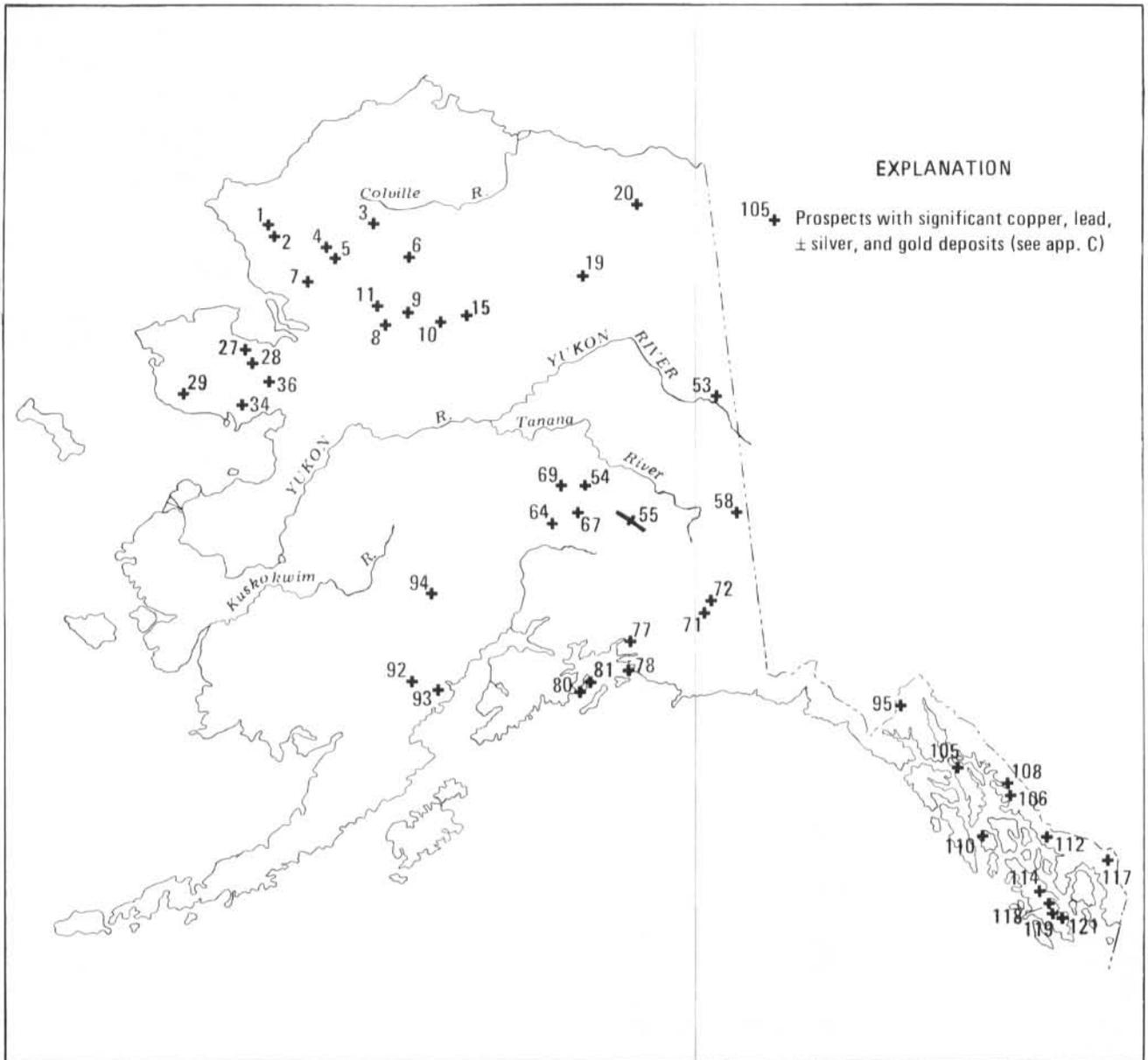


Figure 27. Significant copper, lead, zinc ± silver, and gold deposits and prospects in Alaska.

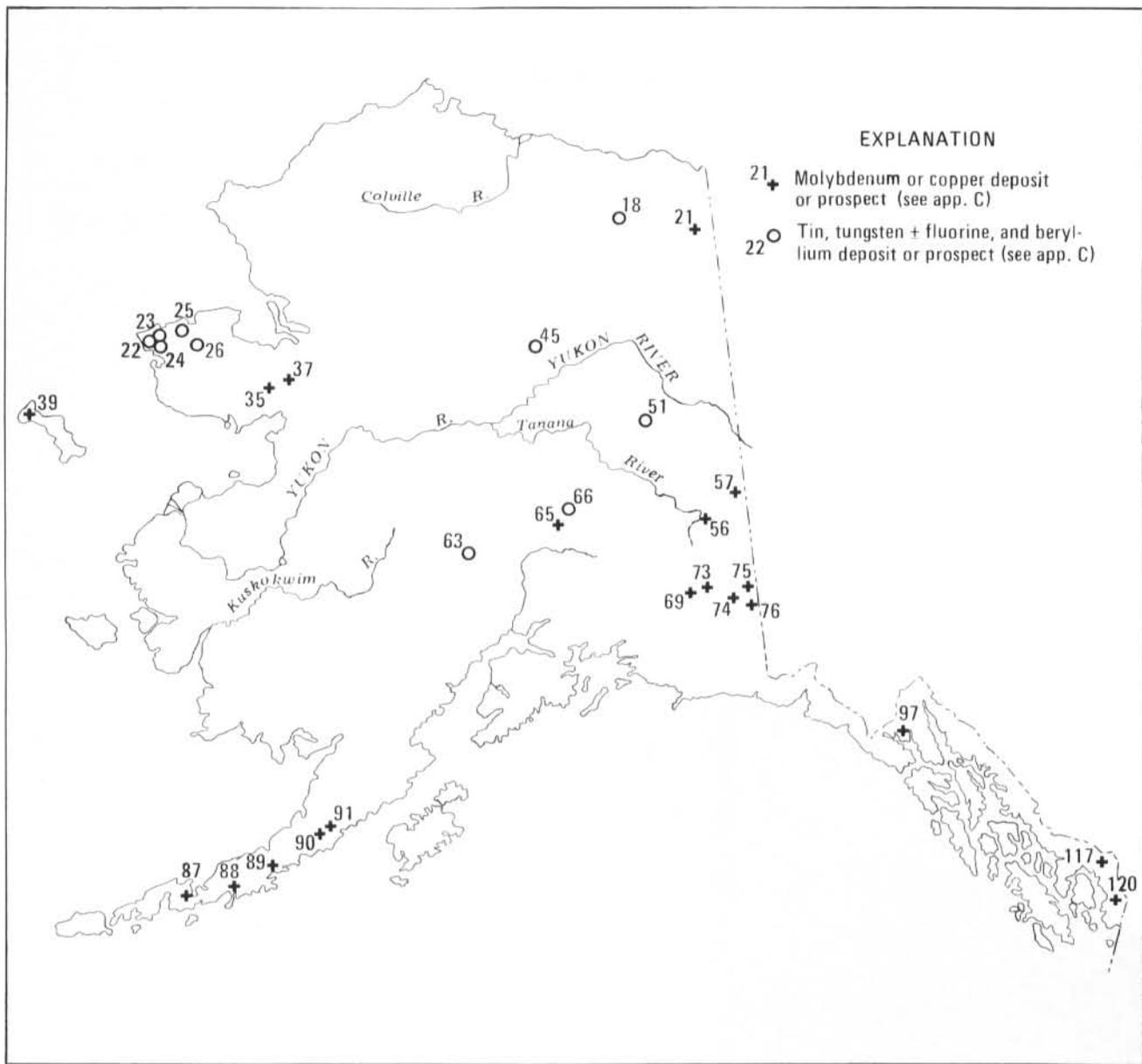


Figure 28. Significant molybdenum or copper and tin, tungsten + fluorine and beryllium deposits and prospects in Alaska.

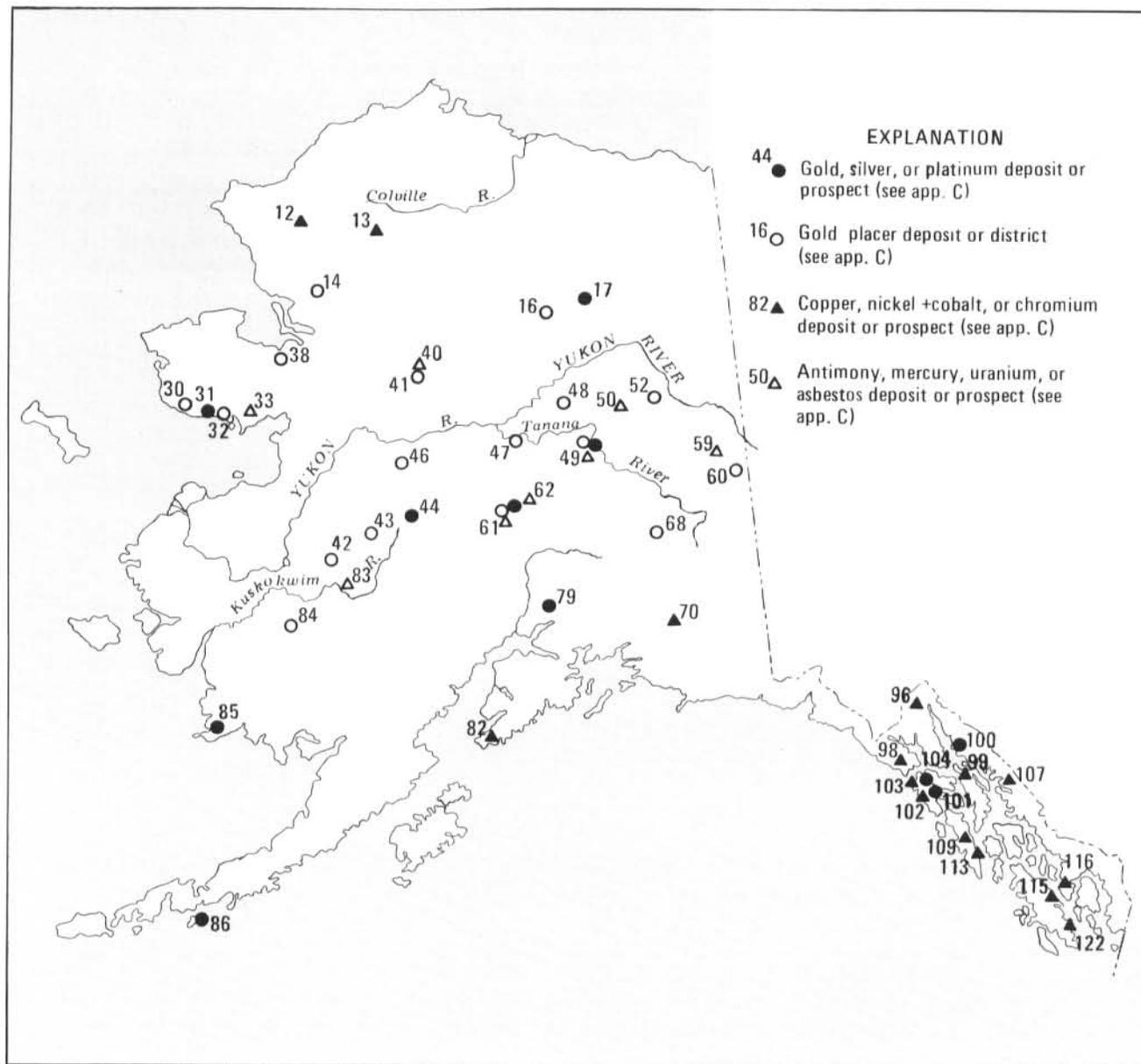


Figure 29. Significant gold, silver, platinum, and strategic-mineral deposits, prospects, or districts in Alaska.

Appendix D

Mining Licenses Issued by the Alaska Department of Revenue, 1983 (Placer gold unless otherwise noted)

ABJ III MINING CO. Box 776 Sterling, Alaska 99672	ALDER CREEK MINES (2) Patricia E. Sather 1213 Coppet Street Fairbanks, Alaska 99701	ANVIL MINING, INC. P.O. Box 1694 Nome, Alaska 99762	BATCHELOR, HAROLD E. 102 Steelhead Road Fairbanks, Alaska 99701
A. B. PLACER (2) ^a P.O. Box 74528 Fairbanks, Alaska 99707	ALEUTIAN AGGREGATE VENTURES P.O. Box 4-D Anchorage, Alaska 99509 (rock, sand)	ARCTIC ALLUVIAL CONSULTANTS Helen Marie Davis SRA Box 4437 Anchorage, Alaska 99502	BAY, THOMAS C. & JOYCE R. (2) SRA Box 60 B Anchorage, Alaska 99507
AOS MINING & ENGINEER- ING P.O. Box 74204 Fairbanks, Alaska 99701	ALDRICH, JAMES & RON 3500 Greeland Drive Anchorage, Alaska 99503	ARCTIC MINING CORPORA- TION (2) P.O. Box 10668 Anchorage, Alaska 99510 (Placer gold, tin)	BEAR CREEK MINING (8) Jay Hammitt 1111 Dowling Road Anchorage, Alaska 99502
AU PLACER, INC. Box 2310 Fairbanks, Alaska 99701	ALDRIDGE, JAMES SR 20553 Fairbanks, Alaska 99701	ARNEY, ROBERT A., SR. 3500 Mt. View, no. 47 Anchorage, Alaska 99504	BEAR CUB no. 1 Dorothy Norma Kovtchak P.O. Box 137 Kotzebue, Alaska 99752
AV MINING CO. Kenneth R. Upchurch General Delivery Candle, Alaska 99728	ALEXANDER, CLIFFORD DALE Box 602 Fairbanks, Alaska 99707	ASSOCIATION FINANCIAL SERVICES CORP. The Forum West Bldg., Suite 209 12501 Bel-Red Rd. Bellevue, Washington 98005	BEDROCK CO. P.O. Box 1505 Fairbanks, Alaska 99707
A.W. & T. CONSTRU- CTION SR Box 5080 Wasilla, Alaska 99687	ALKAM CORPORATION 3874 Caravelle Drive Anchorage, Alaska 99502	AULT ENTERPRISES P.O. Box 82330 Fairbanks, Alaska 99708	BEISTLINE, EARL H. P.O. Box 80148 Fairbanks, Alaska 99708
ACHMAN, ROLAND F. P.O. Box 61185 Fairbanks, Alaska 99701	ALLEMAN, JOHN FRANKLIN SR 90755 Fairbanks, Alaska 99701	AUMILLER, ROBERT (3) SR 71188 Fairbanks, Alaska 99701	BELFIELD, JAMES W. & ROBERT HENRICKS P.O. Box 1934 Fairbanks, Alaska 99707
ADEBE ENTERPRISES Koyle Hatfield General Delivery Fairbanks, Alaska 99707	ALPHA MIDAS James Steward 4832 Palo Verde Ave. Fairbanks, Alaska 99701	AUSTIN, JEFFERY M. (2) Box 1303 Seward, Alaska 99664	BELL, ALBERT LEE Box 422 Sterling, Alaska 99672
ALAMIN MINING CO. Box 71 McGrath, Alaska 99627	ALRUK ENTERPRISES Box 235 Sutton, Alaska 99674	B & B MINING Wiseman Bettles Field, Alaska 99726	BELL, ROCKY J. Box 353 Sterling, Alaska 99672
ALASKA AGGREGATE CORPORATION 7800 Lake Otis Parkway Anchorage, Alaska 99507 (sand, gravel)	AMANETA PLACER (2) Timber Creek Bettles, Alaska 99726	BTW MINING & EXPLORA- TION CORP. (2) SRA 1721 Anchorage, Alaska 99507	BENSON, DANIEL Box 12 Delta Junction, Alaska 99737
ALASKA APEX & MINING James P. Conway SR B Box 7660 Palmer, Alaska 99645 (sand, gravel)	AMAZON EXPLORATION P.O. Box 2266 Fairbanks, Alaska 99707	BAKKE, CARL 912-6th Avenue Fairbanks, Alaska 99701	BEVARD, KEITH EUGENE P.O. Box 146 Ft. Greely, Alaska 99733
ALASKA GOLD CO. (4) P.O. Box 640 Nome, Alaska 99762 P.O. Box 1170 Fairbanks, Alaska 99707	AMERICAN CREEK PARTNERS Dan deLima Box 81467 Fairbanks, Alaska 99708	BAKKEN, CARL S. SR Box 50816-T Fairbanks, Alaska 99701	BIG LAKE SAND & GRAVEL, INC. Roger A. Riddell P.O. Box 17-304 Big Lake, Alaska 99687 (gravel)
ALASKA GRAVEL SALES, INC. 1422 K Street Anchorage, Alaska 99501 (sand, gravel)	ANACONDA MINERALS CO. (6) 2550 Denali Street, Suite 1000 Anchorage, Alaska 99503	BALDRIDGE, JAMES F. P.O. Box 81808 Fairbanks, Alaska 99708	BIG WINDY MINING 409 Clara St. Fairbanks, Alaska 99701
ALASKA SILVEINIA MINES Joseph C. Manga P.O. Box 281 Galena, Alaska 99741 (lode silver, lead)	ANCHORAGE SAND & GRAVEL CO., INC. (3) 1813 East First Avenue Anchorage, Alaska 99501 (sand, gravel)	BARRY, J.M. P.O. Box 1656 Fairbanks, Alaska 99707	BILLINGS, HENRY C. P.O. Box 81117 College, Alaska 99708
ALBETT MINING Box 201 Chicken, Alaska 99573	ANDERSON, WHITTEN H. Box 60081 Fairbanks, Alaska 99706	BARRY, FRANCIS W. & PAUL N. MELVIN 323 West Harvard Anchorage, Alaska 99501	BIRDSELL, RUSSELL L. Boundary, Alaska 99790
	ANNASARA ENTERPRISES SC Box 3073-M Wasilla, Alaska 99687	BARTLING, ROGER P.O. Box 82970 Fairbanks, Alaska 99708	BITTLINGMAIER, KURT Box 471 C SRA Anchorage, Alaska 99507
			BLACK BEAR MINING Tony Unsderfer Tonsina Ct Box 30 Eagle River, Alaska 99577

^aNumbers in parentheses indicate how many separate licenses were issued to a single individual, partnership, or company. In most cases the licenses were issued automatically because two or more Annual Placer Mining Applications were submitted by the same operator. Only operators whose licenses were received by February 1, 1984, are listed. Note that a mining license is not required until actual production begins.

BLACK SANDS MINING CO.
P.O. Box 1478
Wasilla, Alaska 99687

BLACK VELVET (3)
Roy Thomas George
61 Clark St. no. 2
Salinas, California 93901

BLACKEY, DONALD
General Delivery
Nenana, Alaska 99760

BLACK, THOMAS KEERY
631 Karen Way
Henderson, Nevada 89015

BLISS, PATRICK J.
Ungalik R.
c/o Unalakleet, Alaska 99684

BLOOM, GARY J.
Box 153
Kasilof, Alaska 99610

BLUEBIRD ASSOCIATION,
INC.
6661 So. 300 East
Midvale, Utah 84047

BOE-PETE MINING CO.
P.O. Box N2013
Anchorage, Alaska 99511

BONANZA MINING CO.
SR C Box 8451
Palmer, Alaska 99645

BOOMER, JOHN D.
Box 422
Blanchard, Idaho 93404

BOTTOM DOLLAR MINING
CO. (3)
Central, Alaska 99730

BOULDER CREEK MINING CO.
Les Fickes
P.O. Box 2618
Fairbanks, Alaska 99707

BOUTON, GLENN D. &
LELA M. (3)
SR 3 Box 30608
Fairbanks, Alaska 99701

BOUTON, VERN H. &
GLENN D.
SR 3 Box 30608
Fairbanks, Alaska 99701

BOWMAN GROUP
P.O. Box 7
Iliamna, Alaska 99606

BRACKEN, EVERETT O.
Box 1098
Juneau, Alaska 99802

BRANDL, PHILIP
Box 246 SR A
Anchorage, Alaska 99507

BRASS MONKEY RANCH
SR Box 330 - Kenny Lake
Copper Center, Alaska 99575
(gravel)

BRATTLUND, CHESTER H.
3504 Woodland Dr.
Anchorage, Alaska 99503

BREWER, LAWRENCE
Box 1637
Homer, Alaska 99762

BROOKS CO.
Clyde D. Holbrook
P.O. Box 534
Cooper Landing, Alaska 99572
(placer & lode gold, silver,
copper)

BROWN, FRANKLIN OSCAR
P.O. Box 237
Pacific Beach, Washington 98571

BROWN, H.L. &
VIRGIL LAMDUEUX (3)
SR Box 61226
Fairbanks, Alaska 99701

BROWN, NORMAN R.
P.O. Box 1527
Valdez, Alaska 99686

BRUCE, F.L.
Chicken, Alaska 99732
(lode gold, gallium, cadmium)

BUCHANAN, PERRY N. (2)
Box 1306
Seward, Alaska 99664

BUCKSHOT MINING CORP.
P.O. BOX 00383
Nenana, Alaska 99760

BUGLI, JOHN (2)
P.O. Box 21
Soldotna, Alaska 99669

BURNS, DAVID R. &
JACK P. JOHNSON
P.O. Box 265
Gakona, Alaska 99586

BUTLER & GOODMAN
Box 3877
Soldotna, Alaska 99669

BYRD, DICKIE L. (3)
P.O. Box 10084
Fairbanks, Alaska 99710

CDC PARTNERS
Douglas L. Footh
11201 SE 8th, no. 163
Bellevue, Washington 98004
(lode gold, silver)

C. J.'s EQUIPMENT SERVICES
Cal J. Schertenleib
SR Box 80822 H
Fairbanks, Alaska 99701
(gravel)

C & L MINING
Wayne Copley
530 Valley Mall Pkwy.
East Wenatchee, Washington 98801

C.L.D. MINING
284 Cindy Dr.
Fairbanks, Alaska 99701

CNR RESOURCES, INC.
300-5th Avenue S.W.
Calgary, Alberta, CANADA
T2P 3C4

C & W MINING ASSOC.
D.H. Carnell
P.O. Box 60435
Fairbanks, Alaska 99701

CARIBOU CREEK MINING
CO.
P.O. Box 102976
Anchorage, Alaska 99510

CARLO & SONS MINING CO.
2113 Southern
Fairbanks, Alaska 99701

CARLSON, ROBERT DENNIS
6655 Holly Lane
Anchorage, Alaska 99502

CARNELL, DON H. (2)
P.O. Box 60435
Fairbanks, Alaska 99701

CARROLL, LOREN &
BRIAN JOHNSON
Box 104
Central, Alaska 99730

CASLER, BEN
3940 Truro
Anchorage, Alaska 99507

CEREPA, ALEXANDER P.
P.O. Box 1
Kenai, Alaska 99611

CHICKAMAN MINING CO.
General Delivery
Chicken, Alaska 99732

CHISNA MINING CO.
4650 Harvard Circle
Fairbanks, Alaska 99701

CHRISTIES, BOTH &
E.W. LOPEZ
P.O. Box 801
Kodiak, Alaska 99615

CIBOLA CO.
2843 Redwood Pl.
Anchorage, Alaska 99504

CINCO MINING
John R. Autrey
P.O. Box 404
Houston, Texas 77001-0404

CISSIToyer PLACERS, INC.
Manley Hot Springs, Alaska 99756

CITIES SERVICE MINERALS
CORPORATION
P.O. Box 300
Tulsa, Oklahoma 74102
(various)

CLARA BEA, INC. (2)
D.B. Vial & B.W. Comstock
General Delivery
Candle, Alaska 99790

CLARK, DOUGLAS M. &
CLARENCE MILLER
Box 396
Talkeetna, Alaska 99676

CLEARWATER EXPRESS CO.
SR 2, Box 310 Thunderbird Drive
Chugiak, Alaska 99567

CLINT'S MINING CO.
Clenus W. Saathoff
1350 Oxford Drive
Anchorage, Alaska 99503

COASTAL EXPLORATION
James Lawler
Box 386
Kasilof, Alaska 99610

COBB, LES
Rampart, Alaska 99767

COLDFOOT ARCTIC MINING,
INC.
Northward Bldg., Ste. 105
Fairbanks, Alaska 99701

COLDFOOT MINING CO. (2)
Lawrence E. Brown
SR Box 30325
Fairbanks, Alaska 99701

COLE, JOHN H.
SR Box 40725
Fairbanks, Alaska 99701

COLLEDGE, LYLE
Rudy David Arias
573 Wilcox
Fairbanks, Alaska 99701

COLLINS, JESSE T.
P.O. Box 10510
Fairbanks, Alaska 99710

COMINCO ALASKA, INC.
Dave Moore
5660 B Street
Anchorage, Alaska 99503

COMINCO AMERICAN, INC.
5660 B Street
Anchorage, Alaska 99502
(various)

COMPASS MINING CO.
P.O. Box 2700
Fairbanks, Alaska 99707

CONGDEN, CARL J.
P.O. Box 81417
Fairbanks, Alaska 99708

CONNER, MICHAEL A.
SRB 7343-A
Palmer, Alaska 99645

COOK, ALFRED G. &
DANIEL N. SOLECKI (3)
Box 64
Central, Alaska 99730

COOK'S MINING
John Cook
P.O. Box 393
Fairbanks, Alaska 99707

COPPER CREEK MINING CO.
P.O. Box 8
Chitina, Alaska 99566

COPPER VALLEY
CONSTRUCTION CO., INC.
Carol R. Neeley
P.O. Box 165
Glennallen, Alaska 99588
(gravel)

CORAZZA, RICHARD
Box 1320
Homer, Alaska 99503

COWLITZ PLACERS, INC.
Gary E. Miller
P.O. Box 10-1477
Anchorage, Alaska 99511

COYLE, WALDO E. & RUBY S.
P.O. Box 466
Kenai, Alaska 99611
(gravel)

CRENSHAW, DENNIS G. &
GEORGE ZELLER
2141 E. 3rd no. 1-E
Anchorage, Alaska 99501

CRESCENT MINING CO.
Wallace J. Lord
c/o Sunrise Inn
Copper Landing, Alaska 99572

CREVICE CREEK MINING
Crevice Creek Ranch
Betles, Alaska 99726

CROUSE, LARRY T. &
GEORGE BAILEY
P.O. Box 20613
Fairbanks, Alaska 99701

CURTIS, EDGER J.
7716 Island Drive
Anchorage, Alaska 99504
(lode gold, silver, other: expl.)

D & B MINING
SR Box 80459
Fairbanks, Alaska 99701

D & G MINING ASSOCIATES
4310 Dorothy Drive
Anchorage, Alaska 99504

DJW MINING CO.
Dennis J. Warth
6623 Lunar Drive
Anchorage, Alaska 99504

DNL MINING (2)
Donald L. Watts
P.O. Box 81515
College, Alaska 99708

D & O VENTURES (2)
Clifford H. Driskell
235 E. 9th Avenue
Anchorage, Alaska 99501

DAHL, DAVID E. &
LEO E. PAQUETTE
P.O. Box 73718
Fairbanks, Alaska 99707

DALLMAN, ALBERT H.
521 Donna Dr.
Anchorage, Alaska 99504

DAN CREEK VENTURES
P.O. Box 401
Gig Harbor, Washington 98335

DARLO CONSTRUCTION, INC.
3705 Enterprise Dr. S.W.
Rochester, Minnesota 55901

DART, JOHN REED
General Delivery
Manley Hot Springs, Alaska 99756

DAVIS CREEK MINING
John R. Burns
Chicken, Alaska 99732

DAVIS, HARRY
Box 284
Eagle River, Alaska 99577

DEBBINS, BERNICE CLAIR
P.O. Box 631
Kotzebue, Alaska 99752

DEGNAN MINING CO.
Joseph A. Degnan
Box 45
McGrath, Alaska 99627

DENALI RESOURCES, INC.
5409-180th S.E.
Bothell, Washington 98011

DEWANE, DENIS
P.O. Box 91
Moose Pass, Alaska 99631

DIAMOND LAKE GRAVEL
Everett K. Rains
P.O. Box 17-445
Big Lake, Alaska 99687
(gravel)

DICKSON, THOMAS
FLETCHER, JR.
Box 245
Girdwood, Alaska 99587

DIPPEL, DON &
ROGER JENKINS
1211 F Street
Anchorage, Alaska 99501

DIPPEL, DONALD E. (3)
P.O. Box 157
Lehi, Utah 84043

DITMAN, ROB
Chicken, Alaska 99732

DOBNIK MINING (8)
Box 341
Bethel, Alaska 99559

DODIES DREAM ASSOC.
P.O. Box 1935
Fairbanks, Alaska 99707

DREDGE TEC, a J/V
130 W. International Airport
Road, Ste. M
Anchorage, Alaska 99502
(aggregate)

DUFOUR, ARTHUR
Upper De Armour Rd.
Anchorage, Alaska 99504

EVECO INC.
Harold Ellingson
SR Box 20526
Fairbanks, Alaska 99708

ELLIS, EDWARD E. &
JENNIE (2)
Box 824
Cooper Landing, Alaska 99572

ELLRED, BILL
Eagle River, Alaska 99577

EMERSON EXPLORATION, INC.
1811 Phillips Field Road
Fairbanks, Alaska 99701

ENDICOTT MINING
Box 673
Fairbanks, Alaska 99707

ENSERCH EXPLORATION, INC.
Box 1317
Anchorage, Alaska 99501

ENSERCH EXPLORATION, INC.
M.G.R. Bryan
1817 Wood Street
Dallas, Texas 75201
(placer & lode gold, silver)

ERICKSON, EDWARD E. &
HOWARD PETERSON
SRA Box 6611
Palmer, Alaska 99645

ESMINGER, MERL ROBERT
601 E St.
Fairbanks, Alaska 99701

ESTES, W.D. (2)
Box 2377
Soldotna, Alaska 99669

EUREKA CREEK no. 1,2,3
Box 2052
Fairbanks, Alaska 99707

4 GOLD MINING &
EQUIPMENT (2)
c/o Hope Mining Co.
P.O. Box 101827
Anchorage, Alaska 99510

40 MILE MINING CO.
Virginia Bench
Chicken, Alaska 99732

45 PUP MINING CO.
Charles R. Hammond
General Delivery
Chicken, Alaska 88732

FAIRBANKS MINING CO.
James H. Johnson
Box 83024
Fairbanks, Alaska 99708

FAIRBANKS SAND &
GRAVEL, INC.
P.O. Box 686
Fairbanks, Alaska 99707
(gravel)

FAULKNER, HARRY E., SR. &
JEANNINE D. FAULKNER
P.O. Box 1307
Bethel, Alaska 99559

FEIES, BILL
SRA Box 287
Anchorage, Alaska 99507

FERN DEVELOPMENT CO.,
INC.
G.F. Kalmbach
5950 Kincaid Road
Anchorage, Alaska 99502
(underground gold)

FIX, HOWARD C.
Box 403
Northway, Alaska 99764

FLETCHER, DOUGLAS C.
44509 McKenzie Hwy.
Leaburg, Oregon 97489

FORREST, JAMES C. &
EDWARD J. ARMSTRONG
P.O. Box 61106
Fairbanks, Alaska 99706

FORRESTER MINES
4433 Old Seward Hwy.
Anchorage, Alaska 99503

FORTRESS MINING (2)
SR C Box 8458
Palmer, Alaska 99645

FORTUNE MINING CO. OF ALASKA
Route 2, Box 805
Elgin, Oregon 97827

FOSTER, EARLE,
GREGORY MUCKEY, &
JOSEPHINE JURGELEIT
P.O. Box 44
Haines, Alaska 99827

FOSTER, EARLE C. &
RHEA L.
8450 Golden Street
Anchorage, Alaska 99502

FOX GULCH TRIO
22 Glacier no. 7
Fairbanks, Alaska 99701

FRIENO, EMERY LEE, JR.
P.O. Box 3130
Anchorage, Alaska 99501

FRY, CLARENCE
P.O. Box 905
Homer, Alaska 99603

FULTON, GORDON
P.O. Box 118
Central, Alaska 99730

G. D. INC.
P.O. Box 1452
Fairbanks, Alaska 99707

GCO MINERALS CO.
1031 W. 4th Avenue,
Ste. 300
Anchorage, Alaska 99501

G.E.M. ENTERPRISES
Louie W. Knudsen
1011 W. 12th Ave., no. 3
Anchorage, Alaska 99501
(gravel)

GHD RESOURCES, INC.
Douglas B. Colp
1101 Barnette St.
Fairbanks, Alaska 99701

GLD MINING (3)
284 Cindy Drive
Fairbanks, Alaska 99701

GAEDE & LINDMAN DREDGING
Mark A. Gaede
P.O. Box 3121
Soldotna, Alaska 99669

GALLAGHER, PAUL &
FRANK LAMB
SR Box 51329-B
Fairbanks, Alaska 99701

GAME CREEK MINING CO.
420 Ocean View Drive
Anchorage, Alaska 99515

GELVIN, EDWIN C. &
STANLEY M.
Box 18
Central, Alaska 99730

GEORGE, ROY THOMAS &
JOSEPH R. SMITH
61 Clark St., no. 2
Salinas, California 93901

GERAGHTY MINING
Richard W. Geraghty
405 Juneau
Fairbanks, Alaska 99701

GIBSON PLACER MINES
1610 Southern
Fairbanks, Alaska 99701

GILL, TERRY
Box 10
Port Alsworth, Alaska 99653

GLACIER VIEW EQUIPMENT (3)
SR C Box 8456
Palmer, Alaska 99645

GLASS, DONALD C. &
MAX L. HEIFNER (owners)
Larry McCulloch
P.O. Box 266
Alden Highway
Alden, Michigan 49612

GLORYHOLE EXPLORATION (2)
Wayne E. Blank
2812 Wentworth, no. 1
Anchorage, Alaska 99508

GOLDBUG MINING CO.
Box 39
Hope, Alaska 99605

GOLDEN FLEECE MINING CO.
E.B. Joiner
P.O. Box 1
Kotzebue, Alaska 99752

GOLDEN NUGGET MINING CO.
Donald Sanders
Box 773
Eagle River, Alaska 99577

GOOD ROCK PLACER ASSOCIATION
Edward T. McHenry & Doug McRae, Sr.
Box 1333
Seward, Alaska 99664

GORESEN, EDMUND J. (2)
P.O. Box 91
Seward, Alaska 99664

GRAHAM EXPLORATION
Chickin, Alaska 99732

GRANITE MT. MINING
Thomas & Myrtle Johnson
P.O. Box 608
Nome, Alaska 99762

GRANT JAKE MINING CO.
Box 600
Seward, Alaska 99664

GREAT AMERICAN MINING
P.O. Box 1777
Fairbanks, Alaska 99707

GREATLAND EXPLORATION, LTD.
Ronald C. Sheardown
3512 Campbell Airstrip Road
Anchorage, Alaska 99504
(various)

GREEN CONSTRUCTION CO.
2015 Grand Avenue
Des Moines, Iowa 50312
(aggregate)

GREEN MINING & EXPLORATION
Douglas A. Green
SR 22135
Fairbanks, Alaska 99701
(placer gold, silver)

GREEN, HALL M. (6)
P.O. Box 3335
Anchorage, Alaska 99510

GREENE, STEPHEN A.
P.O. Box 2766
Fairbanks, Alaska 99707

GRIFFIN, VERNON EDWARD
4450 E. 6th Ave.
Anchorage, Alaska 99504

GRIZZLY MINE
Tim Staton
P.O. Box 81857
Fairbanks, Alaska 99708

GRUBSTAKE MINING
Harvey B. Linenschmidt
2802 Wesleyan Dr.
Anchorage, Alaska 99504
(placer gold, silver)

GULLYCAT ENTERPRISES
Box 80163
College, Alaska 99708

GUTHERT, ROBERT
2085 Van Horn Road
Fairbanks, Alaska 99701

H & H EXPLORATION & MINING, INC.
Howard J. Hunt
6924 E. 6th
Anchorage, Alaska 99504

H & H MINING
Hugh B. Fate
SR Box 30586
Fairbanks, Alaska 99701

F.W. HAAS CO.
5403 Spenard Rd., no. 15
Anchorage, Alaska 99502

HAGGLAND, JAMES P.
Box 81464
Fairbanks, Alaska 99708

HALL, DIANE MARIE
SRA Box 941
Anchorage, Alaska 99502

HALL, FRANK M.
P.O. Box 1073
Juneau, Alaska 99802

HAMBLIN, MARKAY
SR A 52970
Wasilla, Alaska 99687

HAMILTON MINING ENTERPRISES
P.O. Box 155
Chugiak, Alaska 99567

HAMILTON, HUGH, MARSHALL HAMILTON, & DAN HAYEK
138 Farewell Avenue
Fairbanks, Alaska 99701

HAMMOND, CHARLES R.
Chicken, Alaska 99732

G.A. HANKS & SONS
Box 2533, Hwy. 16
West Sacramento, California 95611

HANSEN GOLD
Box 246
Nome, Alaska 99762

HANSON, ALLEN
3016 W. 30th
Anchorage, Alaska 99503

HANSON PROPERTIES, INC.
P.O. Box 7310
Spokane, Washington 99207

HAPPY VALLEY GRAVEL
O.J. McGann
P.O. Box 174
Anchor Point, Alaska 99556
(gravel)

HARBOUR, LEO THOMAS
P.O. Box 4728
Eielson A.F.B.
Fairbanks, Alaska 99703

HARD ROCK MINING CO.
P.O. Box 10-721
Anchorage, Alaska 99511

HARLING, VIC & LARRY MONAGHAN
Box 86
Central, Alaska 99730

HARRIS SAND & GRAVEL, INC.
P.O. Box 1347
Valdez, Alaska 99686
(sand, gravel)

HARTLEY, A.E. (2)
SRA Box 371-J
Anchorage, Alaska 99507

HASSEN, PETER
P.O. Box 17
Trapper Creek, Alaska 99688

HAWLEY RESOURCE PROPERTIES, INC.
8740 Hartzell Road
Anchorage, Alaska 99507
(coal)

HAYDEN EXPLORATION & MINING (4)
Forest A. Hayden
Box 4953 SRA
Anchorage, Alaska 99507

HEAVY METALS MINING
779-8th Avenue
Fairbanks, Alaska 99701

HEFLINGER MINING & EQUIPMENT CO.
665 10th, no. 307
Fairbanks, Alaska 99701

HELMS, GREGORY J.
P.O. Box 80351
Fairbanks, Alaska 99708

HENRY, WARREN M. & MARY LOU
P.O. Box 4-2395
Anchorage, Alaska 99509

HERNING EXPLORATION & MINING CO.
Bruce Gordon Hering
312 Well St.
Fairbanks, Alaska 99701

HAROLD MINING
Harold F. Parker
General Delivery
Talkeetna, Alaska 99676

HERZOG, MARTIN & JEAN
SR A Box 234
Anchorage, Alaska 99507

HIC MIC MINING
260 M.P. Parks Hwy.
Healy, Alaska 99701

HOLLYWOOD ROAD SAND & GRAVEL
William & Grace Elkins
SR 12860
Wasilla, Alaska 99687
(sand, gravel)

HOOGENDORN, HOMER E. (2)
Box 142
Nome, Alaska 99762

HOOVER, CARLTON LEROY & EUPHA L.
P.O. Box 97
c/o Parker House
Tok, Alaska 99780

HOPEN, ALF
Box 74246
Fairbanks, Alaska 99707

HOUSTON OIL & MINERALS EXPLORATION CO.
Greg Thurow
Tundra Copters
P.O. Box 60670
Fairbanks, Alaska 99706

HOWELL, FLOYD
SRA 3514-C
Anchorage, Alaska 99502

HUNTER CREEK MINE
P.O. Box 80321
Fairbanks, Alaska 99708

INTERIOR ALASKANA ASSOC.
SR 51515
Fairbanks, Alaska 99701

INTERIOR EQUIPMENT, INC.
P.O. Box 826
Delta Junction, Alaska 99737

INTERIOR MINERALS CORPORATION
1668 Market St.
Fairbanks, Alaska 99707

IVY MINING CO.
Joseph Vincent Strunka
P.O. Box 550
Fairbanks, Alaska 99707

J&D MINING
Jimmie Dale
3126 E. 72nd
Anchorage, Alaska 99507

JFM & ASSOCIATES
Box 1032
Bethel, Alaska 99559

J & J BUCKWHEAT ENTERPRISES
John B. Ritter
c/o 1750 Engineers Cutoff
Spur Rd.
Juneau, Alaska 99801
(various lode)

J & S MINING
P.O. Box 11
Cantwell, Alaska 99729

J.T. & SONS ENGINEERING
Box 142
Galena, Alaska 99741

JACKSON MINING CO.
936 Coppet Street
Fairbanks, Alaska 99701

JACKSON, RODNEY D. (2)
P.O. Box 84
Kenai, Alaska 99611

JACOBSON, TIM
P.O. Box 401
Gig Harbor, Washington 98335

JAMES, RICHARD D.
General Delivery
Chicken, Alaska 99723

JAMES, WILLIAM P.
5066 Buckingham Way
Anchorage, Alaska 99503

JENKINS, ROGER
3007 Arctic, no. 3
Anchorage, Alaska 99503

JENSEN, DANIEL D. (2)
Box 12
Delta Junction, Alaska 99737

JOHNSON & SONS
Box 750
Manley Hot Springs, Alaska 99756

JONES, KENNETH EUGENE
Box 374
Sutton, Alaska 99674

JONES & CO.
W. Deering Jones
MP 49 3/4 Anchorage &
Swd. Hwy.
Moose Pass, Alaska 99631
(dredging gold, silver, other)

JONES, WILLIAM J., SR.
P.O. Box 173
Kotzebue, Alaska 99752

K & E MINING
General Delivery
Manley Hot Springs, Alaska 99756

K.L.K., INC.
SR D Box 9070
Palmer, Alaska 99645

KACHEMAK MINING
CORPORATION (2)
Robert C. Busby
SRA Box 50-D
Homer, Alaska 99603

KALBERG, PETER
Box 1067
Willow, Alaska 99688

KANTISHNA LOAD (2)
Larry F. Goldsby &
David Anstett
P.O. Box 4-2404
Anchorage, Alaska 99509

KANTISHNA MINES (2)
Leo Mark Anthony
2020 Lake Otis Pkwy.
Anchorage, Alaska 99504
(lode gold, silver, lead;
placer gold)

KANTISHNA MINING CO.
Box 100466
Anchorage, Alaska 99510

KAVIC MINING CO.
P.O. Box 1411
Fairbanks, Alaska 99707

KELLEY, BOB, owner
Leslie Pederson & Jim Miller
3507 no. D Willow St.
Anchorage, Alaska 99507

KELLIHER, MAURICE
P.O. Box 216
Nome, Alaska 99762

KENDRICK BAY MINING CO.
c/o Standard Metals Corp.
645 Fifth Ave.
New York, New York 10022
(uranium)

KENNEDY, JOE DWAYNE
P.O. Box 8093
Indian Springs, Nevada 89018

KETSCHER, JOHN DAVID
General Delivery
Bettles, Alaska 99721

KILE, ALVIN L. &
ERIC E. (2)
Box 8-424
Anchorage, Alaska 99508

KINYOUN, D.K.
Box 484
Haines, Alaska 99827

KIRBY, RANDY K.
Box 82741
Fairbanks, Alaska 99708

KIRKMAN CONSTRUCTION,
INC.
Box 1111
Sierra Vista, Arizona 85635

KNAEBEL MINING
VENTURES (2)
John Bergelin
P.O. Box 81467
Fairbanks, Alaska 99708

KNOX, DARRELL A. &
GREGORY M. PUTMAN
1621 Stanton Ave.
Anchorage, Alaska 99504

KOBER, FRANK D.
6920 Weimer, no. 4
Anchorage, Alaska 99502

KOONTZ, EDDIE D.
SR 1 - B Box 1409
Eagle River, Alaska 99577

KOSYDAR, LESLIE M.
P.O. Box 495
Sterling, Alaska 99672

KOUGAROK MINING
Box 450
Nome, Alaska 99762

KOYUKUK GOLD CO.
J. Dennis Stacey
5331 E. 26th Avenue, no. 6
Anchorage, Alaska 99504

KRENZKE, MARK K.
P.O. Box
Nenana, Alaska 99760

KRINKE, EARL H.
Box 241
Copper Center, Alaska 99373

KRIZMAN, HENRY & STEPHEN
SRA Box 478-D
Anchorage, Alaska 99507

KROSHUS, GLEN O.
P.O. Box 60948
Fairbanks, Alaska 99706

KVANNE, KATHERINE
Akiak, Alaska 99552

L. A. B. MINING, INC.
Rt. 7, Box 70882
Fairbanks, Alaska 99701

L & B MINING
1015-10th Avenue
Fairbanks, Alaska 99701

L. C. MINING
P.O. Box 1062
Willow, Alaska 99688

L & M SALVAGE
P.O. Box 72933
Fairbanks, Alaska 99707

L & O MINING CORPORATION
Robert O. Lister III
417 Wedgewood, no. 48M
Fairbanks, Alaska 99701

L-S MINING
2023 Turner
Fairbanks, Alaska 99701

LA CROSS, JACK
Rt. 1, Mile 260 Parks Hwy.
Healy, Alaska 99743

LAKEWOOD ASSOCIATION
Box 56
Central, Alaska 99730

LANDTEE NATURAL
RESOURCE CO.
4201 Pinnacle Circle
Anchorage, Alaska 99504

LANGE, ROBERT LEE
5002 Cambridge Way
Anchorage, Alaska 99503

LANGLOE, MONA L.
P.O. Box 463
Wasilla, Alaska 99687

LAYMAN, JAMES ROBERT
Box 44
Eagle, Alaska 99738

LEACH, JAMES B., III
3141 Kennard Circle
Anchorage, Alaska 99504

LEE, ROBERT EDWARD
General Delivery
Chickena, Alaska 99732

LEIBEG, GARY L.
SRA Box 323 F
Anchorage, Alaska 99507

LESTER MINES
SR 40265
Fairbanks, Alaska 99701

LEVINSKI, STEVE (3)
415 E. Morton
Tacoma, Washington 98404

LEWIS, JACK M. (3)
4231 Laurel St., no. 302
Anchorage, Alaska 99504

LIBERTY MINES
SR Box 3212-S
Wasilla, Alaska 99687

LINDFORS/READER CO.
Box 355
Nome, Alaska 99762

LITTLE CREEK MINE
Philip Sayer
Box 2353
Homer, Alaska 99603

RICHARD E. LOHR &
CO., INC.
2531 McKinney Avenue
Dallas, Texas 75201

LONDON, JOHN R. &
LUCILLE A.
1801 State Street
Anchorage, Alaska 99506

LONGLY, GARY T., JR.,
JOYCE & KAREN TUCKER
P.O. Box 1051
Nome, Alaska 99761

LOST RIVER MINING
CORPORATION, LTD.
67 Richmond Street West,
Suite 301
Toronto, Ontario, CANADA
M5H 1Z5
(expl. tin, tungsten, fluorite)

LUCKY SEVEN MINING CO.
Walter Roman & family
P.O. Box 141
Fairbanks, Alaska 99707

LUNCA, DUANE L.
429 School Ct.
Olympia, Washington 98503

LYNDPHIL MINING CO.
P.O. Box 1848
Nome, Alaska 99762

M-B-E-GRAVEL CO.,
M-B CONTRACTING CO., INC.,
& EKLUTNA, INC. a J/V
7101 DeBarr Road
Anchorage, Alaska 99504
(gravel)

M&M MINING & DIVING
Michael K. Carpenter
3705 Iowa Drive
Anchorage, Alaska 99501
(dredge gold)

M & R MINING CO.
Joe Vogler and
Dave Mahan
P.O. Box 60147
Fairbanks, Alaska 99706

MABBOTTS, DAVID
925 SE 1st
Pendleton, Oregon 97801

MACRYER MINE
Brad S. Rogers
SR 20657-C
Fairbanks, Alaska 99701

MAGIC CIRCLE MINING
Phil Meyers
2678 Old Richardson Hwy.
North Pole, Alaska 99705

MAHALKEY, AUSTIN &
EDWARD J. WHITSCHICK
SRA Box 4073B
Anchorage, Alaska 99502

MAIER, PETER FISHER
P.O. Box 55614
North Pole, Alaska 99705

MALL MINING
P.O. Box 353
Delta Junction, Alaska 99737

MANIA MINING
236 Farewell
Fairbanks, Alaska 99701

MANLEY MINING CO.
J. Hook
General Delivery
Manley Hot Springs, Alaska 99756

MANN'S, MICK & CECELIA
Bettles Field
Bettles, Alaska 99726

MANUEL, PAUL
Box 287
Copper Center, Alaska 99573

MARASCO, BLAIR M.
859 B Yak Estates
Fairbanks, Alaska 99701

MARTIN, WALTER
8450 Williwa Avenue
Anchorage, Alaska 99504

MARTINEK, MILAN
SRB Box 7459
Palmer, Alaska 99645

MASON, STEVEN J.
3509 Cope St.
Anchorage, Alaska 99503
(placer gold, silver)

MASSIE, GEORGE T.
 P.O. Box 1042
 Nome, Alaska 99762

MATHEWS, RAY E.
 Tok, Alaska 99780

MAXWELL MINE &
 EXPLORATION (2)
 Leslie L. Maxwell
 SRA Box 482
 Anchorage, Alaska 99507

MAY, MARVIN W.
 Joint Venture Mining
 3308 Glenn Don Dr.
 Anchorage, Alaska 99504

MCCARTHY, GARY &
 DAVID CAVANAGH
 P.O. Box 689
 Girdwood, Alaska 99587

MCCOMBE, R.S. & MURIEL
 Chicken, Alaska 99732

MCGUIRE, SEAN E. (2)
 Wild Lake
 Bettles, Alaska 99726

MCINTOSH MINING CO.
 SR 2, Box 22139
 Fairbanks, Alaska 99701

MT. MCKINLEY GOLD
 Doyle Currier
 P.O. Box 711
 Wasilla, Alaska 99687

MCLAUGHLIN, JAMES A. (2)
 Box 405
 Haines, Alaska 99827

MCMASTER, JIMMY K.
 Box 416
 Talkeetna, Alaska 99676

MEAD, LAWRENCE C.
 P.O. Box 10526
 Fairbanks, Alaska 99701

MEDLEY MINING
 Dick Medley &
 Albert Weatherford
 Rt. no. 1
 Pierce, Idaho 83546

MEINING, EINAR T. (2)
 1111 F Street
 Anchorage, Alaska 99501

MENGES, PHIL, JR.
 P.O. Box 55938
 North Pole, Alaska 99705

MERKES ENTERPRISES
 Leon N. Merkes
 Box 8
 Sterling, Alaska 99672
 (gravel)

MESICH, DRAGO &
 WILLIAM SEXTON
 315 Illinois Street
 Fairbanks, Alaska 99701

MESPELT & ALMASY
 MINING CO.
 Theodore J. Almasy &
 Margaret L. Mespelt
 McGrath, Alaska 99627
 (lode/base, precious)

METCO, INC.
 Frank Dieckgraeff
 P.O. Box 895
 Seward, Alaska 99664
 (gravel)

MIDNIGHT SUN MINING CO.
 P.O. Box 83190
 Fairbanks, Alaska 99701

MIKNICH, CHARLES MARVIN
 SRA Box 1550G
 Anchorage, Alaska 99507

MILLER, HERSHEL &
 BILL BRADLEY
 Box 3523
 Kenai, Alaska 99611

THE MINING CO.
 John E. McClain
 P.O. Box 436
 Soldotna, Alaska 99669

MISCOVICH MINING CO.
 Box 262
 Galena, Alaska 99741

MISCO-WALSH MINING CO.
 John A. Miscovich
 P.O. Box 4D
 Anchorage, Alaska 99509

MITCHELL, DENNIS
 1405 Summitview
 Anchorage, Alaska 99504

MOHAWK OIL & GAS,
 INC. (3)
 P.O. Box 74224
 Fairbanks, Alaska 99707

MONAHAN, HAROLD &
 ALLEN W. HANSON
 Allen W. Hanson
 3010 W. 30th
 Anchorage, Alaska 99503

MONROE EXPLORATION &
 PROSPECTING
 7 Eleanor Avenue
 Fairbanks, Alaska 99701

MOORE, JOHN
 P.O. Box 4-604
 Anchorage, Alaska 99509

MOORE, RON &
 VERN CHERNESKI
 Box 17312
 Big Lake, Alaska 99687

MORROW, JERRY L., SR., &
 RAY RETTER
 Wiseman, Alaska 99790

MRAK PLACER MINE
 P.O. Box 1963
 Palmer, Alaska 99645

MULLIKIN, DONALD E. &
 DAVID L. WILMARTH (2)
 Box 790
 Homer, Alaska 99603

MUNJAR, WALTER L. &
 SAMUEL L.
 SR 60644
 Fairbanks, Alaska 99701

MURPHY, DENNIS JAY
 P.O. Box 462
 Kenai, Alaska 99611

MURPHY, WAYNE A.
 P.O. Box 2172
 Kodiak, Alaska 99615

N&R ENTERPRISES
 Carol R. Neeley
 P.O. Box 165
 Glennallen, Alaska 99588
 (gravel)

NEGUS, FRED & EARL
 General Delivery
 Talkeetna, Alaska 99676

NELCHINA MINES
 A.L. Renshaw, Jr.
 1850 Wickersham Drive
 Anchorage, Alaska 99507

NELIUS, FRED W., JR.
 7330 Cantonment Ct.
 Anchorage, Alaska 99507
 (stibnite)

NEROD, STEVE
 c/o Rosander
 Colorado Creek
 McGrath, Alaska 99627

NESBIT, HAMM, OWENS
 5151 Rose Valley Rd.
 Kelso, Washington 98626

NEUBAUER, JACK
 General Delivery
 Manley Hot Springs, Alaska 99756

NEVERS, HAROLD A. (2)
 8148 Pinewood Drive
 Juneau, Alaska 99801

NEWMONT EXPLORATION,
 LTD.
 300 Park Avenue, 12th floor
 New York, New York 10022
 (various)

NILES, JOHN C.
 P.O. Box 554
 Cooper Landing, Alaska 99572

NORANDA EXPLORATION,
 INC. (3)
 139 East 51st
 Anchorage, Alaska 99503
 (placer gold; expl. base, precious,
 & ferro alloy)

NORCROSS-STONEBURG
 MINING CO.
 James H. Norcross
 Rt. 1, Box 2332
 Chugiak, Alaska 99567

NORDEEN, WILLIAM H. &
 CLAUDE M.
 Emma Creek
 Wiseman, Alaska 99726

NORTH COAST MINING,
 INC. (2)
 P.O. Drawer 250
 Juneau, Alaska 99802

NORTHERN EXPLORATION &
 DIVING, INC.
 209 Dawn Avenue
 Shoreview, Minnesota 55112

NORTHERN MINING CO.
 Al Withrow
 General Delivery
 Bettles, Alaska 99726

NORTHERN OIL OPERATIONS,
 INC. (2)
 Drawer 3293
 Kenai, Alaska 99611
 (gravel, placer gold)

NORTHERN RESOURCES CO. (5)
 Rodney A. Blakestad
 P.O. Box 80770
 Fairbanks, Alaska 99708

NORTHLAND GOLD DREDGING
 Nyac, Alaska 99642

NORTHWEST EXPLORATION,
 INC.
 P.O. Box 81978
 Fairbanks, Alaska 99708

NUGGET ESTATE MINING CO.
 P.O. Box 60430
 Fairbanks, Alaska 99706

NUGGET SAND & GRAVEL (2)
 Glenn W. Ried
 Box 349
 Petersburg, Alaska 99833
 (gravel)

OFFICER, CASEY WILSON
 2615 SE Courtney no. 75
 Milwaukie, Oregon 97222

OLSEN, JOHN ROBERT
 General Delivery
 Hope, Alaska 99605

OLSON, STEPHEN G.
 General Delivery
 Boundary, Alaska 99790

OLSON, STEVEN (2)
 6 1/2 Mile Old Richardson
 Fairbanks, Alaska 99701

OLSON, VERNON JOHN &
 HENRY CURTIS CLINE
 SR Box 60994
 Fairbanks, Alaska 99701

OPHIR CREEK MINING
 General Delivery
 Ruby, Alaska 99586

OPHIR CREEK MINING (2)
 P.O. Box 173
 Trapper Creek, Alaska 99688

ORO FINO MINING CO.
 P.O. Box 5
 Valdez, Alaska 99686

OTTER DREDGING CO. (2)
 Miscovich Bros.
 Flat, Alaska 99584

P & M RESOURCES, INC.
 Michael Howard & Russ Harlie
 P.O. Box 10588
 Curry's Corner
 Fairbanks, Alaska 99710

PMX MINES (2)
 David E. McClurg, Jr.
 4312 Zodiac
 Anchorage, Alaska 99507

P & S MINING
 1215-9th Avenue
 Fairbanks, Alaska 99701

PAGE MINING CO.
 General Delivery
 Chicken, Alaska 99732

PALMER ENTERPRISES
 P.O. Box 634
 Soldotna, Alaska 99669

PARR, GLEN C.
 Rt. 1, MP 260 Parks Hwy.
 Healy, Alaska 99743

PASKVAN, C.
 SR Box 50248
 Fairbanks, Alaska 99701

PASQUALI, PETE, III
Wiseman, Alaska 99726

PAVEY, MARION A. &
BRUCE A.
3288 Adams St., Apt. 203
Fairbanks, Alaska 99701

PAXTON, DAVID
Drum Alone
SR Box 20264
Fairbanks, Alaska 99701

PAYCHECK MINING CO.
General Delivery
Boundary, Alaska 99790

PAYTON, CHARLES, J.
1132 Ivy St., no. 7
Fairbanks, Alaska 99701

PENN JERSEY DRILLING CO.
Lawrence A. Schachle
2833 East 72nd Ave.
Anchorage, Alaska 99507
(gravel)

PETERS, ROLLIN J. (2)
800 F., Apt. R5
Juneau, Alaska 99801

PETERSON, DONALD E.
Box 172
Haines, Alaska 99827

PETERSON, JOE
c/o 7630 Rancho Road
Anchorage, Alaska 99507

PHILLIPS, GERALD CHARLES
SR 10408-B
Fairbanks, Alaska 99701

PHILIPS, ORVILLE H.
Box 278
Soldotna, Alaska 99669

PIERCE, ALBERT H.
Box 529
Haines, Alaska 99827

PITTMAN MINES
Raymond C. Pittman
General Delivery
Manley Hot Springs, Alaska 99756

PLACER EVALUATION, INC.
519 C Street
Anchorage, Alaska 99501

PLACID OIL CO.
550 W. 7th Avenue, Ste. 1100
Anchorage, Alaska 99501

PLACK, PHILIP EARL &
HOLLEY DONA VIKTORJIA
P.O. Box 938
Anchorage, Alaska 99510

POLAR MINING, INC.
4545 Wood River Drive
Fairbanks, Alaska 99701

PORTEN & WAYSON
1148 Sunset Drive
Fairbanks, Alaska 99701

PRIMROSE MINING CO.
Box 1158
Seward, Alaska 99664

PRINGLE, A.W.
General Delivery
Manley Hot Springs, Alaska 99756

PROMISE LAND MINING CO.
Daniel Mathew Wietchy
P.O. Box 60472
Fairbanks, Alaska 99706

PULSON, CHARLES W.
Sterling, Alaska 99672

PURCELL, MIKE H.
SRA Box 133 K
Anchorage, Alaska 99502

PYNE, ERIC CLIFFORD
P.O. Box 82694
College, Alaska 99708

QUARTZ CREEK EXPLORATION
CO.
Route 2, Box 242
Sterling, Alaska 99672

QUEENE ALICE GOLD
MINING CO.
1166 Coppet St.
Fairbanks, Alaska 99701

R.G.V. MINING CO.
Douglas L. & Sadie Miller
P.O. Box 1587
Fairbanks, Alaska 99708

RML MINING CORPORATION
Robert M. Lucas
2933 Firethorne Avenue
Fullerton, California 92635

R & S MINING CO.
1546 N Street
Anchorage, Alaska 99501

R & W MINING
John E. Wortman
Ophir, Alaska 99627

RAHOI, PHILIP
1129 Lakeview Terrace
Fairbanks, Alaska 99701

RATHBURN & SONS MINING
Box 167
Central, Alaska 99730

REB CO.
P.O. Box 55440
North Pole, Alaska 99705

RED HAT MINE
M.C. Jauhola
P.O. Box 00245
Nenana, Alaska 99760

RED TAPE MINING CO.
M. Martinek
SRG Box 7459
Palmer, Alaska 99645

REGAN, JOHN E.
P.O. Box 1176
Fairbanks, Alaska 99707

REHECTSEN, ROGER P.
SR Box 50251
Fairbanks, Alaska 99701

PARADISE "PEEK"
John B. Ritter
c/o 1750 Engineers Cutoff
Spur Rd.
Juneau, Alaska 99801
(lode, various)

ROBERTS, BOB & ELLIS
Chicken, Alaska 99732

ROBERTS, ELLIS & BOB
Box 225
Tok, Alaska 99780

ROCK-HARD MINING CO.
John H. Wagner
3564 Herriwood Pl.
Anchorage, Alaska 99504

ROCK & OTHER FELLERS
2347 Loussac Dr.
Anchorage, Alaska 99503

ROCKING, NORMAN & JEAN
SR Box 70374
Fairbanks, Alaska 99701

ROGERS & BABLER (2)
Div. of Mapco Alaska, Inc.
1301 E. 64th
Anchorage, Alaska 99502
(gravel)

ROSANDER MINING CO. (2)
Box 84
McGrath, Alaska 99627

ROYANN MINING
Edward R. Stugart
SR Box 70241
Fairbanks, Alaska 99701

RUBEL, JOHN D.
SR Box 90574
Fairbanks, Alaska 99701

RUBY MINING (2)
Albert W. Kangas
Box 1
Ruby, Alaska 99768

RUSSELL, GENE
1695 W. Bakerview Rd.
Bellingham, Washington 98225

RYBACHEK, STANLEY C.
P.O. Box 55698
North Pole, Alaska 99705

S.E.P.P. MINING CO.
P.O. Box 73193
Fairbanks, Alaska 99707

S & S MINING CO.
4041 Wright Street
Anchorage, Alaska 99504

S. & W. TRUST
Stephen H. James
1905 Northwestern Ave.
Anchorage, Alaska 99504

ST. JOE AMERICAN CORP.
John W. Horton
2002 N. Fornes Blvd.
Tucson, Arizona 85745
(nonferrous)

SANDFORD RESOURCES,
INC. (2)
General Delivery
Wasilla, Alaska 99687

SANDY'S MINING
1131 Lakeview Terrace
Fairbanks, Alaska 99701

SAVAGE, BRUCE D.
General Delivery
Manley Hot Springs, Alaska 99750

SCHMUCK, ARTHUR J.
P.O. Box 343
Nenana, Alaska 99760

SCHUMACHER, WALTER
P.O. Box 2479
Palmer, Alaska 99645

SEWARD PENINSULA
MINING CO.
Edwin L. Hatch
Granite Mountain
P.O. Box 1801
Nome, Alaska 99762
(placer gold, silver)

SHEFFIELD, WILLIAM LEE
4442 E. 4th Ave.
Anchorage, Alaska 99508

SHENANDOAH MINING ASSOC.,
INC. (2)
P.O. Box 41762
Phoenix, Arizona 85080

SHOESTRING ENTERPRISES
SR Box 8424
Palmer, Alaska 99645

SHORT GULCH MINING CO.,
LTD.
P.O. Box 9
Ruby, Alaska 99768

SILBAUG, JEFF
3120 Totem
Fairbanks, Alaska 99701

SILVER STAR MINING
Melvin N. Barry
323 West Harvard
Anchorage, Alaska 99501
(lode silver)

SINGIN SAM'S RAINBOW MINE
P.O. Box 1411
Fairbanks, Alaska 99707

SIPES, JOHN
Box 55254
North Pole, Alaska 99705

SLIPPERY ROCK MINE
Lloyd Sackett
6820 A-1
Palmer, Alaska 99645

SLUICE UNLIMITED
SR Box 50669
Fairbanks, Alaska 99701

SMITH MINING CO.
Rural Route 4
Faribault, Minnesota 55021

SMITH, RONALD W.
P.O. Box 772
Haines, Alaska 99827

SMITH, SHERMAN CLAYTON
Box 770
Cooper Landing, Alaska 99572

SMITH, WILLIAM L.
3948 Lore Rd.
Anchorage, Alaska 99507

SNOW LION MINING CO.
General Delivery
Haines, Alaska 99827

SOULE, HAROLD L.
SR A, Box 239
Anchorage, Alaska 99507

SPAULDING, SAMUEL
1036 E. 7th Ave.
Anchorage, Alaska 99501

SPECK, RAYMOND S.
P.O. Box 1042
Anchorage, Alaska 99510

SPEERSTRA'S, INC.
BOX 186
Glennallen, Alaska 99588

SPRUCE CREEK MINING CO.
Ophir
McGrath, Alaska 99627

SPRUCE VALLEY MINING CO.
P.O. Box 81552
College, Alaska 99705

STARKEY, FRANK DEE
4110 Debarr Space 20 E.
Anchorage, Alaska 99504

STATON, TIMOTHY L.
P.O. Box 81857
Fairbanks, Alaska 99708

STEFANOWSKI, JAMES WILLIAM
P.O. Box 161
Talkeetna, Alaska 99676

STERN, BRADLEY JACK
2420 Redwood Street
Anchorage, Alaska 99504

STEWART, HERBERT IVAN (2)
531 West 4th
Anchorage, Alaska 99501

STEWART, JACKIE J.
P.O. Box 813
Delta Junction, Alaska 99737

STICKMAN & SONS &
DAUGHTERS
Box 114
Galena, Alaska 99741

STRATTON, DAVID JOEL
32 Craig Avenue
Fairbanks, Alaska 99701

STRICKLER, WILLIAM R. &
GEORGE R.
SRA Box 474-K
Anchorage, Alaska 99507

STUBBLEFIELD, Y.R. &
JOHN (2)
Box 570
Soldotna, Alaska 99669

SUMMIT SILVER, INC.
P.O. Box 488
Coeur D' alene, Idaho 83814

SUMNER, RICHARD P.
1350 - 64 N.E. Stephens
Roseburg, Oregon 97470

SUNRISE CONSOLIDATED
MINES
Box 51
Hope, Alaska 99605
(lode, various)

SUNRISE EXPLORATION
SERVICES (15)
Box 51
Hope, Alaska 99605
(placer gold and various lode)

SUNSHINE MINING CO.
P.O. Box 1080
Kellog, Idaho 83837

SUTTON, GERALD
2901 Iris Drive
Anchorage, Alaska 99503

SWAINBANK, RICHARD C.
Box 81315
Fairbanks, Alaska 99708

SWAN, BILL, BILL TOMAN, &
KEITH OLSON
P.O. Box 10109
Fairbanks, Alaska 99710

SWANBERG, NELS & MARGARET
Box 719
Nome, Alaska 99762

SWANELY, RON
P.O. Box 114
Eagle River, Alaska 99577

SWIFT CREEK MINING CO.
P.O. Box 24
Ruby, Alaska 99768

T.J. MINING
SRD Box 9068
Palmer, Alaska 99645

TAYLOR, A.J.
407 1/2 D Street
Fairbanks, Alaska 99701

TERRITORIAL CORPORATION
P.O. Box 6217
Albuquerque, New Mexico 87197

TERRY, MIKE
General Delivery
Central, Alaska 99730

TESSIER, TOM
11504 E. 24th
Spokane, Washington 99206

THAYER, AVERILL SHELDON
Box 80052
College, Alaska 99708

THISTLE CREEK MINING CO.
SR 51329-B
Fairbanks, Alaska 99701

THOENNES, MARK
2068 Bridgewater
Fairbanks, Alaska 99701

THREE CHANNEL MINING CO. (2)
SR Box 20135
Fairbanks, Alaska 99701

THREE RIVERS MINING CO.
P.O. Box 102875
Anchorage, Alaska 99501

THURMAN OIL & MINING (3)
925 Aurora Drive
Fairbanks, Alaska 99701

TOK GOLD EXPLORATION &
MINING CO.
Jim Steward
SR Box 71185
Fairbanks, Alaska 99701

TOM-KAT MINING CO.
Burton Carver
Box 40
Soldotna, Alaska 99669

TOOHEY, CYNTHIA D. &
CAMLEO W. (3)
P.O. Box 113
Girdwood, Alaska 99587

TRAIL MINING &
DEVELOPMENT CO.
Sidney A. Abbott
SRA Box 100
Anchorage, Alaska 99502
(lode gold, silver, copper)

TRI-CON MINING, INC. (5)
P.O. Box 2357
Fairbanks, Alaska 99707
(placer & lode gold)

TRUMP, JEANNE E.
Mt. Parker Properties
P.O. Box 289
Juneau, Alaska 99802
(lode gold, silver)

TUCKER, ROBERT &
JAMES LEGGETT (2)
3101 Rose Street
Anchorage, Alaska 99504

TULUKSAK DREDGING
Nyac, Alaska 99642

TURNER, WALLACE D., II
2564 State St.
Fairbanks, Alaska 99701

TURNER, WAY, O'MAARA
PARTNERSHIP
P.O. Box 74414
Fairbanks, Alaska 99707

N.B. TWEET & SONS
Box 503
Teller, Alaska 99778

TWEITEN, OSCAR
P.O. Box 162
Fairbanks, Alaska 99707

TWIN DOME MINE
Box 58
Eagle, Alaska 99738

TWO BEAR MINING CO.
Hank Mulligan
P.O. Box 2222
Fairbanks, Alaska 99707

TWO MJN ASSOC.
Rt. 2, Box 256
Sterling, Alaska 99672

TYREE, LLOYD L. (2)
P.O. Box 3-4027 ECB
Anchorage, Alaska 99501

TRAUTNER, JOHN JAMES
Box 593
Girdwood, Alaska 99587

UNDERWOOD, DAVID & LES
114 Mi. Steese Hwy.
Central, Alaska 99730

UPPER BIRD CREEK
PARTNERSHIP
Michael R. Goldenstein
3605 Arctic Blvd., Ste. 1018
Anchorage, Alaska 99503

URBAN, BOB & KATHY, &
DAN BAUMILLER (2)
301 Erceg
Fairbanks, Alaska 99701

VAN OSTRAND, TOM C.
P.O. Box 46
Usibelli, Alaska 99787

VAN ZELST, THEODORE W.
1313 Wagner Road
Glenview, Illinois 60025
(lode copper)

VELIKANJE, BETTY K. (2)
2600 Draper Drive
Anchorage, Alaska 99503

VIDAL, ANGEL
Pearly Creek, no. 1
4357 Spenard, Apt. C
Anchorage, Alaska 99503

W & H SAND AND GRAVEL
Bob E., Hans, &
Carolyn Wortham
P.O. Box 403
Soldotna, Alaska 99669
(sand, gravel)

WALLER, CECIL &
ROBERT BRADLEY (2)
Box 503
Soldotna, Alaska 99669

WALSH, DANIEL K. & PEARSE M.
P.O. Box 504
Nome, Alaska 99762

WARNER, DARELL H.
Box 529
Haines, Alaska 99827

WASSERMAN, ERIC
J.B. Doherty, Representative
3111 E. 43rd
Anchorage, Alaska 99504

WATERFIELD, HENRY W.
P.O. Box 4-IA
Anchorage, Alaska 99509

WEAVER, VERNON &
DONALD SCHENK
General Delivery
Chicken, Alaska 99732

WELLS, STEPHEN F.
P.O. Box 100844
Anchorage, Alaska 99510
(placer gold, silver)

WESCOTT, ANDREW
1132 Lakeview Terrace
Fairbanks, Alaska 99701

WESTERN ALASKAN MINING &
OUTFITTING
139 South Beverly Drive
Beverly Hills, California 90212

WHEELER, TICHUED ORR
427 Ingra
Anchorage, Alaska 99501

WHITE MINING CO.
P.O. Box 2794
Fairbanks, Alaska 99709

WHITE, PAUL WATKINS
SR Box 60995A
Fairbanks, Alaska 99701

WHITTEN, RONALD W.
P.O. Box 411
Bethel, Alaska 99559

WIATER, ALEX
432 L/1 So. Franklin, no. 5
Juneau, Alaska 99801

WILCOX, GENE
8021 Williwa
Anchorage, Alaska 99504

WILD RIVER VENTURES
General Delivery
Bettles, Alaska 99726

WILKINSON, FRED D.
P.O. Box 1
Central, Alaska 99730

WILKS, RONALD DOUGLAS
3605 Arctic Blvd., no. 606
Anchorage, Alaska 99503

WILLI, BEN & LOIS
P.O. Box 97
Central, Alaska 99730

WILLIAMS, DOVER T. &
BILL R.
SR 20571
Fairbanks, Alaska 99701

WILLIAMS, WILBUR A.
Flat, Alaska 99584

WILLS, JERRE, WINNIE &
CHERYL
Homer, Alaska 99603

WILMARTH, RICHARD CLAIR
Red Devil, Alaska 99656

WILSON, DONALD (2)
General Delivery
Bettles, Alaska 99726

WILSON'S MINING CO. (2)
Chicken, Alaska 99732

WINDY CREEK TIMBERLINE
MINING CO.
P.O. Box 231
Copper Center, Alaska 99573

WITHROW MINING CO. (2)
General Delivery
Bettles, Alaska 99726

WOLFF, WALTER V.
c/o Boundary Lodge
Boundary, Alaska 99790

WREDE, RON
P.O. Box 7
Central, Alaska 99730

WRIGHT, JULES (2)
P.O. Box 60113
Fairbanks, Alaska 99706

WYLIE, JAMES R.
P.O. Box 208
Aptos, California 95001-0208
(mercury)

WYMAN, LEWIS
Chicken, Alaska 99732

WYRICK, L.E.
General Delivery
Red Devil, Alaska 99656

YOUNG, DONALD E.
P.O. Box 2469
Fairbanks, Alaska 99707

YRJANA, ALBERT M.
Box 5
Ruby, Alaska 99768

YUKON MINING CO., INC. (2)
P.O. Box 101454
Anchorage, Alaska 99510

YUKON MINING CO. OF
ALASKA (2)
P.O. Box 80325
Fairbanks, Alaska 99708

YUTAN CONSTRUCTION CO. (2)
Carroll-Vondra, Inc.
James A. Carroll &
Lewis F. Vondra
P.O. Box 1275
Fairbanks, Alaska 99707
(basalt)

ZIMMER, GEORGE W.
2009 E. 3rd, Apt. 18E
Anchorage, Alaska 99501

JD ZIMMERMAN MINING &
EXPLORATION
General Delivery
Manley Hot Springs, Alaska 99756

ZOLTON, JERRY L.
P.O. Box 58322
Fairbanks, Alaska 99701

Appendix E

Selected Sand, Gravel, and Quarry-Stone Operators,^a 1983

<p>ALAGCO-ALASKA AGGREGATE CORPORATION 7800 Lake Otis Parkway Anchorage, Alaska 99507</p>	<p>COPPER VALLEY CONSTRUCTION CO., INC. P.O. Box 165 Glennallen, Alaska 99588</p>	<p>HARRIS SAND & GRAVEL, INC. P.O. Box 1347 Valdez, Alaska 99686</p>	<p>NUGGET SAND & GRAVEL Box 349 Petersburg, Alaska 99833</p>
<p>ALASKA APEX & MINING SR B Box 7660 Palmer, Alaska 99645</p>	<p>CORDOVA, CITY OF Box 1210 Cordova, Alaska 99574</p>	<p>HOLLYWOOD ROAD SAND & GRAVEL SR 12860 Wasilla, Alaska 99687</p>	<p>PENN JERSEY DRILLING CO. 2833 East 72nd Avenue Anchorage, Alaska 99507</p>
<p>ALASKA DEPT. OF NATURAL RESOURCES^b Division of Land and Water Management 4420 Airport Way Fairbanks, Alaska 99701</p>	<p>COYLE, WALDO E. & RUBY S. P.O. Box 466 Kenai, Alaska 99611</p>	<p>JUNEAU, CITY OF 155 S. Seward Street Juneau, Alaska 99801</p>	<p>PETERSBURG, CITY OF P.O. Box 329 Petersburg, Alaska 99833</p>
<p>ALASKA GRAVEL SALES, INC. 1422 K Street Anchorage, Alaska 99501</p>	<p>DIAMOND LAKE GRAVEL P.O. Box 17-445 Big Lake, Alaska 99687</p>	<p>KETCHIKAN, CITY OF 334 Front Street Ketchikan, Alaska 99901</p>	<p>ROGERS & BABLER Div. of Mapco Alaska, Inc. 1301 E. 64th Anchorage, Alaska 99502</p>
<p>ALEUTIAN AGGREGATE VENTURES P.O. Box 4-D Anchorage, Alaska 99509</p>	<p>DREDGE TEC, a J/V 130 W. International Airport Road, Ste. M Anchorage, Alaska 99502</p>	<p>KODIAK, CITY OF Box 1397 Kodiak, Alaska 99615</p>	<p>U.S. BUREAU OF INDIAN AFFAIRS P.O. Box 3-8000 Juneau, Alaska 99801</p>
<p>ANCHORAGE, CITY OF Department of Public Works P.O. Box 400 Anchorage, Alaska 99510</p>	<p>EVECO INC. SR Box 20526 Fairbanks, Alaska 99708</p>	<p>M-B-E GRAVEL CO., M-B CONTRACTING CO., INC., and EKLUTNA, INC., a J/V 7101 Debarr Road Anchorage, Alaska 99504</p>	<p>U.S. FOREST SERVICE, REGION 10 Box 280 Cordova, Alaska 99570 Box 1628 Juneau, Alaska 99801</p>
<p>ANCHORAGE SAND & GRAVEL CO., INC. 1813 East First Avenue Anchorage, Alaska 99501</p>	<p>FAIRBANKS SAND & GRAVEL, INC. P.O. Box 686 Fairbanks, Alaska 99707</p>	<p>MERKES ENTERPRISES Box 8 Sterling, Alaska 99672</p>	<p>W&H SAND AND GRAVEL P.O. Box 403 Soldotna, Alaska 99669</p>
<p>ASPEN EXPLORATION CORP. 3525 South Tamarac St., Ste. 350 Denver, CO 80237</p>	<p>FEDERAL AVIATION ADMINISTRATION 701 C Street P.O. Box 14 Anchorage, Alaska 99513</p>	<p>MATANUSKA-SUSITNA BOROUGH Box B Palmer, Alaska 99645</p>	<p>WRANGELL, CITY OF Wrangell, Alaska 99929</p>
<p>BIG LAKE SAND & GRAVEL, INC. P.O. Box 17-304 Big Lake, Alaska 99687</p>	<p>G.E.M. ENTERPRISES 1011 W. 12th Avenue, no. 3 Anchorage, Alaska 99501</p>	<p>METCO, INC. P.O. Box 895 Seward, Alaska 99664</p>	<p>YUTAN CONSTRUCTION CO. Carroll-Vondra, Inc. P.O. Box 1275 Fairbanks, Alaska 99707</p>
<p>BRASS MONKEY RANCH SR Box 330 - Kenny Lake Copper Center, Alaska 99575</p>	<p>GREEN CONSTRUCTION CO. 2015 Grand Avenue Des Moines, Iowa 50312</p>	<p>N & R ENTERPRISES P.O. Box 165 Glennallen, Alaska 99588</p>	
<p>C.J.'s EQUIPMENT SERVICES SR Box 80822 H Fairbanks, Alaska 99701</p>	<p>HAPPY VALLEY GRAVEL P.O. Box 174 Anchor Point, Alaska 99556</p>	<p>NORTHERN OIL OPERATIONS, INC. Drawer 3293 Kenai, Alaska 99611</p>	

^aThis listing includes information from companies whose mining licenses were received at DGGs by January 1984 and from questionnaire responses. Other companies may be noted in telephone directories (yellow pages) and in DGGs Special Report 31.

^bPrimary state agency for disposal of geological construction materials; sells mainly to North Slope oil and service companies. Other state agencies (such as the Department of Transportation and Public Works) also use or dispose of materials, but these materials are partly acquired from DNR, and amounts and cash flow are minor compared to total Alaskan production.

Back Cover —

upper left — Hank Giegerich, President and General Manager, Cominco-Alaska and John Schaeffer, President, NANA Regional Corporation discuss Red Dog project.
photo by Charlie Green

upper right — Drillers from NANA Region man drill rig on Red Dog project.
photo by Jerry Booth

center — Bulk sample of molybdenum ore from Bear Meadow adit, Quartz Hill deposit, awaiting testing at Hanna Mining Co. Test Pilot Plant in Minnesota.
photo by Engineering Staff, U.S. Borax and Chemical Co.

lower left — Usibelli's "Ace-in-the-hole" dragline with reclaimed coal mining area in foreground.
photo by Malcolm Lockwood

lower right — Coal mine owner-operator, Joe Usibelli.
photo by Malcolm Roberts

